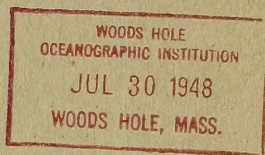


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DEPARTMENT OF THE ARMY  
CORPS OF ENGINEERS



THE  
BULLETIN

OF THE

BEACH EROSION BOARD

OFFICE, CHIEF OF ENGINEERS  
WASHINGTON, D. C.

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DEPARTMENT OF THE ARMY

CORPS OF ENGINEERS

**THE BULLETIN  
OF THE  
BEACH EROSION BOARD**

**OSCILLATORY WAVES**

**Diagrams and Tables of Relationships**

**Commonly Used in Investigations**

**of Surface Waves**

**SPECIAL ISSUE NO. I**

**JULY 1, 1948**

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## FOREWORD

The study of surface wave phenomena, particularly progressive oscillatory waves in water, has engaged the attention of many investigators in recent years and has resulted in significant advances in our knowledge. With increased knowledge the importance of wave action as a factor in the solution of engineering problems of coastal and shore areas has become more and more apparent.

In furtherance of its statutory obligation to publish technical information useful to the public concerned with the study of shore lines the Beach Erosion Board has arranged with the University of California the publication and dissemination of this paper for the benefit of those engaged in protecting our shores from the ravages of the seas.

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Contribution of the  
DEPARTMENT OF ENGINEERING  
UNIVERSITY OF CALIFORNIA  
BERKELEY

This compilation of information was completed under contract NObs 2490 for the Bureau of Ships, U. S. Navy. The major portion of the work was completed by Robert L. Wiegel with occasional suggestions being made by John D. Isaacs and J. W. Johnson. Assistance in making computations and preparing the diagrams was given by M.E. Haet, H. M. Gallaher and Mrs. R. Steele.

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## Diagrams and Tables of Relationships

### Commonly Used in Investigations

#### of Surface Waves

#### Introduction

The purpose of this compilation of data is to assemble for easy accessibility various functions that are used most frequently in investigations involving various surface wave phenomena. For convenience this material has been arranged in two sections. The first section consists of diagrams which are most useful in instances where a graphical solution gives sufficient accuracy for the particular problem. For those problems where a relatively high degree of accuracy is required a section of tabulated wave functions is presented. Where necessary, a brief summary of the theory and explanatory notes are given for each diagram and table.

The symbols used throughout this compilation are as follows:

$T$  = Wave period

$H$  = Wave height

$H_0'$  = Deep water height of wave which approaches shore  
without refraction

$L$  = Wave length

$C$  = Wave velocity

$C_G$  = Wave group velocity

$D$  or  $d$  = Depth beneath still-water level

$n$  = Fraction of energy advancing with wave velocity

$K$  = Pressure response factor

$-_o$  = Subscript refers to deep water

$M$  = Energy coefficient

$\alpha$  = Angle of wave crest to bottom contour

$a_s$  = Length of semi-major axis of orbit of water particles

$b_s$  = Length of semi-minor axis of orbit of water particles

## Diagrams of Wave Functions

Relationship Between Depth and the Height, Period, Length, and Velocity of Waves: Plates 1 - 9, inclusive, present the relationship between wave period, length, velocity, and depth. These curves have been plotted from the following equations:

$$C = \sqrt{\frac{gL \tanh \frac{2\pi d}{L}}{2\pi}} \quad (1)$$

$$L = CT \quad (2)$$

On Plate 1 velocity has been eliminated, giving the relationship between wave period and length for curves of constant depth. Plate 2 is a large scale plot of the region on Plate 1 where the wave length is less than 70 feet and the wave period is less than 5 seconds. In Plate 3 wave length has been eliminated to give a relationship between period and velocity for constant depths. Plate 4 is a large scale plot of the portion of Plate 3 where the period is less than 1.8 second and the wave velocity is less than 5 feet per second. Plate 5 shows velocity plotted against depth with period as a parameter.

Plate 6 is from Breakers and Surf, Hydrographic Office Publication No. 234 and gives the relationship between wave velocity, wave period, and depth. These curves differ from those in Plate 5 because a small correction for deep water steepness has been made.

Plate 7 shows depths in fathoms plotted against wave period in minutes with curves of constant velocity and curves of constant  $d/L$ . Velocity is in knots. The equations for these curves are derived from equations (1) and (2); thus, substituting  $CT$  for  $L$  in equation (1):

$$C = \frac{gT}{2\pi} \tanh \frac{2\pi d}{CT} \quad (3)$$

Solving for  $d$ :

$$d = \frac{CT}{2\pi} \tanh^{-1} \frac{2\pi C}{gT} \quad (4)$$

Putting in the proper constants to change  $d$  from feet to fathoms,  $C$  from feet per second to knots, and  $T$  from seconds to minutes:

$$d = 2.69 CT \tanh^{-1} (0.00548 C/T)$$

or

$$d = 1.343 CT \left[ \log_e (1 + 0.00548 C/T) - \log_e (1 - 0.00548 C/T) \right] \quad (5)$$

For the curves of constant  $d/L$ , the substitution of  $L^2/T^2$  was made for  $C^2$  in equation (1); thus,

$$\frac{L^2}{T^2} = \frac{g}{2\pi} \frac{L}{\tanh} \frac{2\pi d}{L} \quad (6)$$

Multiplying both sides of equation (6) by  $d/L^2$ :

$$\frac{d}{T^2} = \frac{g}{2\pi} \frac{d}{L} \frac{2\pi d}{\tanh L} \quad (7)$$

Thus, for a given value of  $d/L$ ,  $d$  and  $T$  may be calculated.

Plate 8 has the same axes as Plate 7 and shows curves of constant wave length and constant  $d/L$ . The curves of constant  $d/L$  are plotted in the same manner as those on Plate 7. The equation for plotting the vertical asymptotes of the curves for constant wave length is derived from equation (2). To change the wave length from feet per second to knots, and the period from seconds to minutes:

$$L = 33.78 \text{ CT} \quad (8)$$

Then from equation (3):

$$\frac{2\pi C}{gT} = \tanh \frac{2\pi d}{CT} \quad (9)$$

In deep water  $\frac{2\pi d}{CT}$  is very large, and the hyperbolic tangent approaches one. Then:

$$C = \frac{gT}{2\pi}$$

or

$$C = \frac{T}{0.00548} \quad (10)$$

where  $C$  is in knots and  $T$  is in minutes. Since the vertical asymptote for the curves of constant wave length is in the deep water region of the graph, the value of  $C$  in equation (10) may be substituted in equation (8).

$$T = 0.01275 \sqrt{L_0} \quad (11)$$

The equation for the diagonal asymptotes is derived by:

$$\begin{aligned} L &= CT = \sqrt{gd} \ T \\ dT^2 &= \frac{L^2}{77280} \end{aligned} \quad (12)$$

The transitional portion of the curves of constant wave length are plotted by multiplying the  $L$  parameter by  $0.5 d/L$  to get the value  $d$ ; this point is then located by following the  $d/L$  curve to its intersection with the value of the ordinate  $d$ .

Plate 9 is Plate 1 from Breakers and Surf and shows generalized curves for the change in velocity, height, and length of waves in shallow water from deep water to the point of breaking. These curves refer to waves that approach a shore directly so that there are no effects due to refraction. The horizontal scale of the graph is  $d/L_0$ , the relative depth. The vertical scale gives the values of the different functions indicated on the various curves.

- (a)  $H/H'_0$       A theoretical curve for waves of very low steepness showing the change in wave height with decreasing depth prior to breaking. It is used to give the height of the wave at any given depth, when the period and height in deep water are known.
- (b)  $H_b/H'_0$       An empirical curve showing the ratio between the height of the breaker and the wave height in deep water, when the period and depth of breaking are known. This curve, in conjunction with curve (e), can be used in forecasting wave conditions.
- (c)  $\frac{\sin \infty}{\sin \infty_0}$       A theoretical curve for waves of very low steepness showing the change in velocity and length of a wave as it enters shallow water. It is used to give the length and velocity of a wave at any given depth, when the period is known. This same curve gives the change in direction of a wave as it approaches a straight shore line, and the ratio of the semi-minor and semi-major axis of the particle orbit.  
 $C/C_0$   
 $b_s/a_s$   
 $L/L_0$
- (d)  $C_b/C_0$       An empirical curve showing the ratios between the velocity and length at breaking and the velocity and length in deep water, respectively, when the depth of breaking and period are known. This curve represents a refinement that is usually unnecessary in forecasting wave conditions.  
 $L_b/L_0$
- (e)  $100 H'_0/L_0$       An empirical curve showing the relative depth at which a wave of a given steepness will break. The steepness is expressed in per cent in order to fit the vertical scale. This curve, in conjunction with curve (b), can be used in forecasting surf conditions.  
Breaker  
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- (f)  $\frac{H/L}{H'_0/L_0}$       A theoretical curve showing the change in wave steepness as the wave enters shallow water.
- (g) 0.001N      An empirical curve showing the correction factor for velocity due to steepness. The curve gives  $1/1000$  of the value of  $N$  in order to make it fit the vertical scale. It is not used in forecasting but it could be used in the determination of surf characteristics from aerial photographs.

- (h)  $n$  A theoretical curve showing the fraction of energy advancing with the wave at a given relative depth. The value of  $n$  is used in computing  $H/H'_0$ .

Determination of Wave Height and Depth of Water at Point of Breaking:

All the curves on Plate 10 (Plate III from Breakers and Surf) deal with waves that approach a shore line directly, so that there are no changes due to refraction. When waves approach a shore line at an angle, the refraction correction first must be applied. Plate 10 is used in forecasting and in the interpretation of aerial photographs.

Given values of  $H'_0$  and  $T$  define a point for which corresponding values of  $H_b$  and  $d_b$  are found by interpolation between the solid and dashed lines, respectively. To find the wave length or velocity at the breaking depth,  $d_b$ , or at any other depth, enter the inset with this value of  $d$ , follow horizontally to the proper value of  $T$ , and read off  $L$  on the top scale. The velocity is then found from the ratio  $C = L/T$ .

Measure the wave length,  $L$ , at any depth,  $d$  (not necessarily the breaker depth), and find  $T$  from the inset. Enter the main graph with  $T$  and follow a vertical line to the proper value of  $d_b$ . Read off  $H_b$  from the solid lines and  $H'_0$  from the scale to the left or right of the diagram.

Effect of Capillarity on Wave Velocity: Plate 11 is a plot of curves showing the effect of capillarity on wave velocity. Wave velocity has been plotted as a function of wave length both with and without surface tension effects. The per cent error or per cent difference between the velocity as determined by the two velocity equations also is plotted as a function of wave length. It is to be noted that for a wave length greater than 0.4 feet, the error in neglecting surface tension effects is less than one per cent.

Effect of Refraction on Wave Direction: Plates 12 and 13 show the effect of refraction on wave direction. They give the angle  $\alpha$  between the wave front and the bottom contours in shallow water for given values of the ratio,  $d/L_0$ , as a function of the angle  $\alpha_0$  in deep water between the wave front and the contours. This relationship is derived from Snell's law; that is:

$$\frac{\sin \alpha}{\sin \alpha_0} = \frac{C}{C_0} \quad (13)$$

where  $C$  is the velocity in shallow water and  $C_0$  is the velocity in deep water. For given values of  $d/L_0$ ,  $C/C_0$  can be found from Plate 9, so  $\alpha$  can be plotted for various values of  $\alpha_0$ . Plate 12 covers the range of  $d/L_0$  from 0.0 to 0.5. Plate 13 is a larger scale drawing of the region  $d/L_0$  between zero and 0.1.

The curves on Plate 14 (Plate II, Breakers and Surf) give the effect of refraction on wave height and direction for waves approaching at an angle toward a straight shore line where the bottom contours are straight and parallel to the shore. The horizontal scale is  $d/L_0$ , the relative

depth. The vertical scale is  $\infty$ , the angle between the wave crests in deep water and the bottom contours.

The solid curves are lines of equal  $\infty$ , the angle between the wave crest and the depth contour at any relative depth. When the period and angle in deep water are known, these curves are used to obtain the angle of the waves at any given depth.

The dashed curves are lines of equal K, the correction factor to be applied to the wave height in deep water to get the wave height in shallow water.

Surface Wave Heights from Under-water Pressure Measurements: Plate 15 gives the factor for computing surface wave heights from data taken by under-water pressure measurements. For a pressure unit located at a distance of Z below the surface in a total depth of water D where waves of length L exist, Plate 15 gives the value of the pressure response K, which is defined as the ratio of the head of the pressure fluctuation at the submerged point, to the surface wave height.

Forecasting of Wind Waves and Swell: Plate 16 is used to determine whether fetch or duration is the limiting factor for wave characteristics at the end of the fetch. The graph is entered with the duration (in hours) and the wind velocity (in knots) and the corresponding minimum fetch length read off from the lines of constant fetch (thus a duration of 36 hours and a wind velocity of 35 knots gives a minimum fetch length of 400 nautical miles). If the actual fetch is less than this minimum fetch, then fetch is the limiting factor, and an equivalent duration is selected; if the actual fetch is greater than this minimum fetch, then duration is the limiting factor. The latter is the usual case.

Plate 17 or 18 is used to determine the wave characteristics at the end of the fetch from the duration selected from Plate 16. The graph is entered with the duration (in hours) and the wind velocity (in knots), and the corresponding wave heights and periods read off from the lines of constant height and period. (Thus a duration of 36 hours, and a velocity of 35 knots gives a corresponding wave height of 25 feet, and period of 10 seconds at the end of the fetch.)

Plate 19 can be used to determine the wave characteristics at the end of the fetch when fetch is the limiting factor or when an equivalent fetch has been selected. The plate is entered into the fetch length (in nautical miles) and the wind velocity (in knots) and the corresponding wave height and period read off from the lines of constant height and period. (Thus a 100 mile fetch and a 35 knot wind give a wave height of 19 feet and period of 6.7 seconds at the end of the fetch.)

Plate 20 is used to determine the wave characteristics at the end of the decay area. The graph is entered with the decay distance (in nautical miles) and the period at the end of the fetch (as determined from Plate 17, 18 or 19) and the corresponding height ratio, period, and travel time read off from the lines of constant value. (Thus a decay distance of 1000 miles and a 12 second period give a height ratio of 0.47, a period of 16 seconds, and a travel time of 41 hours.) The period at the end of

the decay area is thus given by the graph, the height obtained by multiplying the height at the end of the fetch by the height ratio (in the above case the decay height would be  $0.37 \times 25 = 9.25$  feet), and the arrival time by adding the travel time to the time of the map used.

Plates 16 - 20, inclusive were developed at the Scripps Institution of Oceanography. These plates are revisions\* of curves which originally appeared in the Navy Hydrographic Office publication, "Wind Waves and Swell, Principles of Forecasting," H.O. Miscellaneous Publication 11-275.

### Tables of Functions of $d/L$ and $d/L_0$

In many of the basic equations describing gravity waves various functions of  $d/L$  and  $d/L_0$  occur. Some of these wave equations were discussed above and summarized in graphical form in Plates 1 to 20. In evaluating these equations in certain instances it is often just as convenient and certainly more accurate to utilize tabulated values of various functions of  $d/L$  and  $d/L_0$ . Those functions that are presented below in tabular form are summarized in Plate 21. The theory involved in calculating the various terms in the tables is discussed as follows:

Values of  $\tanh 2\pi d/L$ ,  $b_s/a_s$ ,  $L/L_0$ , and  $C/C_0$ : The basic equation for wave velocity (where the wave steepness is small) is

$$C^2 = \frac{gL}{2\pi} \tanh 2\pi d/L$$

In deep water, that is, where  $d \geq 1.0 L_0$ ,  $\tanh 2\pi d/L$  approaches unity and since  $L = CT$  and  $L_0 = C_0 T$  (Note that deep water ordinarily is defined as  $d \geq 0.5 L_0$ . However in these tables it is noted that the values of  $\tanh 2\pi d/L$  departs appreciably from unity for the range  $d/L_0 = 0.5$  to  $d/L_0 = 1$ )

$$C_0^2 = \frac{g}{2\pi} I_0, C_0 = \frac{g}{2\pi} \cdot T$$

thus

$$\frac{C^2}{C_0^2} = \frac{\frac{g}{2\pi} L \tanh 2\pi d/L}{\frac{g}{2\pi} L_0} = \frac{L}{L_0} \tanh 2\pi d/L$$

and

$$\frac{C \cdot L/T}{C_0 \cdot L_0/T} = \frac{L}{L_0} \tanh 2\pi d/L, C/C_0 = \tanh 2\pi d/L$$

so

$$C^2/C_0^2 = C/C_0 \cdot \tanh 2\pi d/L = L/L_0 \tanh 2\pi d/L,$$

$$C/C_0 = L/L_0$$

therefore, we have\*

$$C/C_0 = L/L_0 = \tanh 2\pi d/L \quad (14)$$

The wave length changes with depth, and so it is inconvenient to use  $d/L$  as a parameter. The most convenient term to measure is the period, since it is a constant. Thus,  $L_0$  may be computed easily because  $L_0 = \frac{g}{2\pi} T^2$ ; therefore, it is most convenient to use the parameter  $d/L_0$

$$d/L \times L/L_0 = d/L_0, \text{ and } L/L_0 = \tanh 2\pi d/L$$

At any value of  $d/L$ ,  $L/L_0$  can be had from  $L/L_0 = \tanh 2\pi d/L$ , and by multiplying  $d/L \times L/L_0$ ,  $d/L_0$  can be obtained. In order to build up a table of  $d/L_0$  vs  $L/L_0$  and  $C/C_0$  a series of expanded accurate graphs were made by plotting  $d/L_0$  vs  $d/L$  and then for the interval of  $d/L_0$  chosen, the corresponding values of  $d/L$  were read off. Then the values of  $L/L_0$  and  $C/C_0$  were recomputed.

In addition, in shallow water, the orbital motion is elliptical and the ratio of the semi-minor ( $b_s$ ) and the semi-major ( $a_s$ ) of the surface orbit is equal to the  $\tanh 2\pi d/L$ , i.e.,  $b_s/a_s = \tanh 2\pi d/L$ . In the tables to follow values of  $\tanh 2\pi d/L$  (which is equal to  $b_s/a_s$ ,  $C/C_0$ , and  $L/L_0$ ) are given in column 4 as a function of  $d/L_0$  or  $d/L$ .

Pressure Response Factor: In order to make use of under-water pressure instruments, it is necessary to know what height of wave give a particular pressure response at some depth below the still water level. It has been found\*\* that

$$K = H'/H = P/P_0 = \frac{\cosh 2\pi d/L \cdot \frac{z}{(1-d)}}{\cosh 2\pi d/L} \quad (15)$$

where  $P$  is the pressure fluctuation at a depth  $z$  below still water,  $P_0$  is the surface pressure fluctuation,  $d$  is the depth of water (from still water level to the ocean bottom),  $L$  is the wave length in any particular depth of water,  $H$  is the height of wave at the surface, and  $H'$  is the corresponding variation of head at a depth  $z$ .

\* Breakers and Surf, Principles of Forecasting, Hydrographic Office Publication No. 234.

\*\* Sub-surface Pressures Due to Oscillatory Waves, by R. G. Folsom. Trans. American Geophysical Union, Vol. 28, No. 6, December 1947, pp 875-881.

The solution of this is, of course, a family of curves, with a parameter ( $\bar{z}/d$ ), with  $K$  plotted against  $d/L$ . However, for the purpose of this table, only one value of  $\bar{z}/d$  will be used because usually the instrument is placed on the bottom ( $\bar{z}/d = 1$ ). In this case

$$K = \frac{1}{\cosh 2\pi d/L} \quad (16)$$

Values of  $K$  are shown in column 7 of the tables.

Fraction of Energy Advancing With the Velocity of the Wave Crest:  
According to the irrotational wave theory only a fraction of the total wave energy travels forward with the wave form (that is, with the wave velocity  $C$  rather than the group velocity  $C_g$ )\*. The equation for this fraction,  $n$ , is

$$n = \frac{1}{2} \left[ 1 + \frac{4\pi d/L}{\sinh 4\pi d/L} \right] \quad (17)$$

Values of this term are shown in column 11 of the tables.

Ratio of Group Velocity to Deep-Water Wave Velocity:

$$C_g/C_0 = C_g/C \quad . \quad C/C_0 = n \tanh 2\pi d/L \quad (18)$$

See column 12 of the tables for this term.

Energy Coefficient: This term is defined by the expression\*\*

$$M = \frac{\pi^2}{2 \tanh^2 \frac{2\pi d}{L}} \quad (19)$$

in the equation for the energy of waves

$$E = \frac{W L H^2}{8} \left( 1 - M \frac{H^2}{L^2} \right) \quad (20)$$

See column 14 of the tables for values of  $M$ .

\* A Summary of the Theory of Oscillatory Waves, Technical Report No. 2, Beach Erosion Board, Washington, D. C., 1942. p 32.

\*\* Wave Action in Relation to Engineering Structures, by D. D. Gaillard, The Engineer School, Fort Belvoir, Virginia. Reprinted 1935.

Effect of Shoaling: An additional item included in the table is the ratio of wave height in shallow water to its deep water wave height when unaffected by refraction.\* This is equal to

$$H/H_0 = \sqrt{\frac{1}{2} \cdot \frac{1}{n} \cdot \frac{1}{C/C_0}} \quad (21)$$

Hyperbolic Functions of  $d/L$ : In addition to the above functions, values of  $\sinh 2 \pi d/L$ ,  $\cosh 2 \pi d/L$ ,  $\sinh 4 \pi d/L$  and  $\cosh 4 \pi d/L$  have been put in the tables as well as  $2 \pi d/L$  and  $4 \pi d/L$ . These have been put in as functions of  $d/L_0$ , that is, for a given  $d/L_0$  the values of  $\sinh 2 \pi d/L$  and etc. are given.

Accuracy of Computations: The values were arrived at using five place figures and then after all of the work was completed, the last place was dropped with the corresponding change of one figure up or down in the fourth place. Because the basic interpolation was done with graphs, errors of one in the fourth significant figure may exist. Because of this, and because the square of the hyperbolic tangent is used to find the energy coefficient, only three places were reported for a certain range as it was felt that the additional figure could not be justified. Actually, in practice, it has been found that usually three figures are the greatest accuracy to which measurements can be made. However, when dealing with differences, this last place is needed to give the desired results.

It must be remembered that occasionally an accumulation must be added to one of the values of  $d/L$ . Thus in  $4 \pi d/L$  the accumulation is increased by the factor of  $4 \pi$  and so the first differences between values of the  $\sinh$  and  $\cosh$  of  $4 \pi d/L$  will jump. However, the corresponding values of  $n$  were plotted on an extended series of graphs and a curve drawn through them and then the correct values read off and placed in the table. Thus the true values of  $n$  vs  $d/L_0$  are in the tables.

It is to be noted that for the convenience of the user the summary of the various data is presented in two tables. Table I shows the various terms for even values of  $d/L$ , and Table II shows the same terms for even values of  $d/L$  over the range where interpolation in Table I is inconvenient.

\* \* \*

TABLE I

FUNCTIONS OF  $d/L$  FOR EVEN INCREMENTS OF  $d/L_0$

from 0.0001 to 1.000

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh \frac{\pi d}{L}$	$\sinh \frac{2\pi d}{L}$	$\cosh \frac{2\pi d}{L}$	K	$\frac{L}{\pi} d/L$	$\sinh \frac{L}{\pi} d/L$	$\cosh \frac{L}{\pi} d/L$	n	$C_G/C_0$	H/H <sub>0</sub>	M
0	0	0	0	0	1	1	0	0	1	1	0	$\infty$	$\infty$
.0001000	.003990	.02507	.02506	.02507	1.0003	.9997	.05014	.05016	1.001	.9998	.02506	4.467	7.855
.0002000	.005643	.03546	.03544	.03547	1.0006	.9994	.07091	.07097	1.003	.9996	.03543	3.757	3.928
.0003000	.006912	.04343	.04340	.04344	1.0009	.9991	.08686	.08697	1.004	.9994	.04336	3.395	2.620
.0004000	.007982	.05015	.05011	.05018	1.0013	.9987	.1003	.1005	1.005	.9992	.05007	3.160	1.965
.0005000	.008925	.05608	.05602	.05611	1.0016	.9984	.1122	.1124	1.006	.9990	.05596	2.989	1.572
.0006000	.009778	.06144	.06136	.06148	1.0019	.9981	.1229	.1232	1.008	.9988	.06128	2.856	1.311
.0007000	.01056	.06637	.06627	.06642	1.0022	.9978	.1327	.1331	1.009	.9985	.06617	2.749	1.124
.0008000	.01129	.07096	.07084	.07102	1.0025	.9975	.1419	.1424	1.010	.9983	.07072	2.659	.983.5
.0009000	.01198	.07527	.07513	.07534	1.0028	.9972	.1505	.1511	1.011	.9981	.07499	2.582	874.3
.001000	.01263	.07935	.07918	.07943	1.0032	.9969	.1587	.1594	1.013	.9979	.07902	2.515	787.0
.001100	.01325	.08323	.08304	.08333	1.0035	.9966	.1665	.1672	1.014	.9977	.08285	2.456	715.6
.001200	.01384	.08694	.08672	.08705	1.0038	.9962	.1739	.1748	1.015	.9975	.08651	2.404	656.1
.001300	.01440	.09050	.09026	.09063	1.0041	.9959	.1810	.1820	1.016	.9973	.09001	2.357	605.8
.001400	.01495	.09393	.09365	.09407	1.0044	.9956	.1879	.1890	1.018	.9971	.09338	2.314	562.6
.001500	.01548	.09723	.09693	.09739	1.0047	.9953	.1945	.1957	1.019	.9969	.09663	2.275	525
.001600	.01598	.1004	.1001	.1006	1.0051	.9949	.2009	.2022	1.020	.9967	.09977	2.239	493
.001700	.01648	.1035	.1032	.1037	1.0054	.9946	.2071	.2086	1.022	.9965	.1028	2.205	463
.001800	.01696	.1066	.1062	.1068	1.0057	.9943	.2131	.2147	1.023	.9962	.1058	2.174	438
.001900	.01743	.1095	.1091	.1097	1.0060	.9940	.2190	.2207	1.024	.9960	.1087	2.145	415
.002000	.01788	.1123	.1119	.1125	1.0063	.9937	.2247	.2266	1.025	.9958	.1114	2.119	394
.002100	.01832	.1151	.1146	.1154	1.0066	.9934	.2303	.2323	1.027	.9956	.1141	2.094	376
.002200	.01876	.1178	.1173	.1181	1.0069	.9931	.2357	.2379	1.028	.9954	.1161	2.070	359
.002300	.01918	.1205	.1199	.1208	1.0073	.9928	.2410	.2433	1.029	.9952	.1193	2.047	343
.002400	.01959	.1231	.1225	.1234	1.0076	.9925	.2462	.2487	1.031	.9950	.1219	2.025	329
.002500	.02000	.1257	.1250	.1260	1.0079	.9922	.2513	.2540	1.032	.9948	.1243	2.005	316
.002600	.02040	.1282	.1275	.1285	1.0082	.9919	.2563	.2592	1.033	.9946	.1268	1.986	304
.002700	.02079	.1306	.1299	.1310	1.0085	.9916	.2612	.2642	1.034	.9944	.1292	1.967	292
.002800	.02117	.1330	.1323	.1334	1.0089	.9912	.2661	.2692	1.036	.9942	.1315	1.950	282
.002900	.02155	.1354	.1346	.1358	1.0092	.9909	.2708	.2741	1.037	.9939	.1338	1.933	272

\*Also:  $b_s/a_s$ ,  $C/C_0$ ,  $L/L_0$

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	$K$	$L\pi d/L$	$\sinh L\pi d/L$	$\cosh L\pi d/L$	$n$	$C_C/C_0$	$H/H_0$	$M$
.003000	.02192	.1377	.1369	.1382	1.0095	.9906	.2755	.2790	1.038	.9937	.1360	1.917	263
.003100	.02228	.1400	.1391	.1405	1.0098	.9903	.2800	.2837	1.040	.9935	.1382	1.902	255
.003200	.02264	.1423	.1413	.1427	1.0101	.9900	.2845	.2884	1.041	.9933	.1404	1.887	247
.003300	.02300	.1445	.1435	.1449	1.0104	.9897	.2890	.2930	1.042	.9931	.1425	1.873	240
.003400	.02335	.1467	.1456	.1472	1.0108	.9893	.2934	.2976	1.043	.9929	.1446	1.860	233
.003500	.02369	.1488	.1477	.1494	1.0111	.9890	.2977	.3021	1.045	.9927	.1466	1.847	226
.003600	.02403	.1510	.1498	.1515	1.0114	.9887	.3020	.3065	1.046	.9925	.1487	1.834	220
.003700	.02436	.1531	.1519	.1537	1.0117	.9884	.3061	.3109	1.047	.9923	.1507	1.822	214
.003800	.02469	.1551	.1539	.1558	1.0121	.9881	.3103	.3153	1.049	.9921	.1527	1.810	208
.003900	.02502	.1572	.1559	.1579	1.0124	.9878	.3144	.3196	1.050	.9919	.1546	1.799	203
.004000	.02534	.1592	.1579	.1599	1.0127	.9875	.3184	.3238	1.051	.9917	.1565	1.788	198
.004100	.02566	.1612	.1598	.1619	1.0130	.9872	.3224	.3280	1.052	.9915	.1584	1.777	193
.004200	.02597	.1632	.1617	.1639	1.0133	.9869	.3263	.3322	1.054	.9912	.1602	1.767	189
.004300	.02628	.1651	.1636	.1659	1.0137	.9865	.3302	.3362	1.055	.9910	.1621	1.756	184
.004400	.02659	.1671	.1655	.1678	1.0140	.9862	.3341	.3403	1.056	.9908	.1640	1.746	180
.004500	.02689	.1690	.1674	.1698	1.0143	.9859	.3380	.3444	1.058	.9906	.1658	1.737	176
.004600	.02719	.1708	.1692	.1717	1.0146	.9856	.3417	.3483	1.059	.9904	.1676	1.727	172
.004700	.02749	.1727	.1710	.1736	1.0149	.9853	.3454	.3523	1.060	.9902	.1693	1.718	169
.004800	.02778	.1745	.1728	.1754	1.0153	.9849	.3491	.3562	1.062	.9900	.1711	1.709	165
.004900	.02807	.1764	.1746	.1773	1.0156	.9846	.3527	.3601	1.063	.9898	.1728	1.701	162
.005000	.02836	.1782	.1764	.1791	1.0159	.9843	.3564	.3640	1.064	.9896	.1746	1.692	159
.005100	.02864	.1800	.1781	.1809	1.0162	.9840	.3599	.3678	1.066	.9894	.1762	1.684	156
.005200	.02893	.1818	.1798	.1827	1.0166	.9837	.3635	.3715	1.067	.9892	.1779	1.676	153
.005300	.02921	.1835	.1815	.1845	1.0169	.9834	.3670	.3753	1.068	.9889	.1795	1.669	150
.005400	.02948	.1852	.1832	.1863	1.0172	.9831	.3705	.3790	1.069	.9887	.1811	1.662	147
.005500	.02976	.1870	.1848	.1880	1.0175	.9828	.3739	.3827	1.071	.9885	.1827	1.654	145
.005600	.03003	.1887	.1865	.1898	1.0178	.9825	.3774	.3864	1.072	.9883	.1843	1.647	142
.005700	.03030	.1904	.1881	.1915	1.0182	.9822	.3808	.3900	1.073	.9881	.1859	1.640	140
.005800	.03057	.1921	.1897	.1932	1.0185	.9818	.3841	.3937	1.075	.9879	.1874	1.633	137
.005900	.03083	.1937	.1913	.1949	1.0188	.9815	.3875	.3972	1.076	.9877	.1890	1.626	135

$d/L_0$	$d/L$	$2\pi d/L$	$\text{TANH } 2\pi d/L$	$\text{SINH } 2\pi d/L$	$\text{COSH } 2\pi d/L$	$K$	$L\pi d/L$	$\text{SINH } 4\pi d/L$	$\text{COSH } 4\pi d/L$	$n$	$C/C_0$	$H/H_0$	$M$
.006000	.03110	.1954	.1929	.1967	1.0192	.9812	.3908	.4008	1.077	.9875	.1905	1.620	133
.006100	.03136	.1970	.1945	.1983	1.0195	.9809	.3911	.4044	1.079	.9873	.1920	1.614	130
.006200	.03162	.1987	.1961	.2000	1.0198	.9806	.3973	.4071	1.080	.9871	.1935	1.607	128
.006300	.03188	.2003	.1976	.2016	1.0201	.9803	.4006	.4114	1.081	.9869	.1950	1.601	126
.006400	.03213	.2019	.1992	.2033	1.0205	.9799	.4038	.4148	1.083	.9867	.1965	1.595	124
.006500	.03238	.2035	.2007	.2049	1.0208	.9796	.4070	.4183	1.084	.9865	.1980	1.589	123
.006600	.03264	.2051	.2022	.2065	1.0211	.9793	.4101	.4217	1.085	.9863	.1994	1.583	121
.006700	.03289	.2066	.2037	.2081	1.0214	.9790	.4133	.4251	1.087	.9860	.2009	1.578	119
.006800	.03313	.2082	.2052	.2097	1.0217	.9787	.4164	.4285	1.088	.9858	.2023	1.572	117
.006900	.03338	.2097	.2067	.2113	1.0221	.9784	.4195	.4319	1.089	.9856	.2037	1.567	116
.007000	.03362	.2113	.2082	.2128	1.0224	.9781	.4225	.4352	1.091	.9854	.2051	1.561	114
.007100	.03387	.2128	.2096	.2144	1.0227	.9778	.4256	.4386	1.092	.9852	.2065	1.556	112
.007200	.03411	.2143	.2111	.2160	1.0231	.9774	.4286	.4419	1.093	.9850	.2079	1.551	111
.007300	.03435	.2158	.2125	.2175	1.0234	.9771	.4316	.4452	1.095	.9848	.2093	1.546	109
.007400	.03459	.2173	.2139	.2190	1.0237	.9768	.4346	.4484	1.096	.9846	.2106	1.541	108
.007500	.03482	.2188	.2154	.2205	1.0240	.9765	.4376	.4517	1.097	.9844	.2120	1.536	106
.007600	.03506	.2203	.2168	.2221	1.0244	.9762	.4406	.4549	1.099	.9842	.2134	1.531	105
.007700	.03529	.2218	.2182	.2236	1.0247	.9759	.4435	.4582	1.100	.9840	.2147	1.526	104
.007800	.03552	.2232	.2196	.2251	1.0250	.9756	.4464	.4614	1.101	.9838	.2160	1.521	102
.007900	.03576	.2247	.2209	.2265	1.0253	.9753	.4493	.4646	1.103	.9836	.2173	1.517	101
.008000	.03598	.2261	.2223	.2280	1.0257	.9750	.4522	.4678	1.104	.9834	.2186	1.512	100
.008100	.03621	.2275	.2237	.2295	1.0260	.9747	.4551	.4709	1.105	.9832	.2199	1.508	98.6
.008200	.03644	.2290	.2250	.2310	1.0263	.9744	.4579	.4741	1.107	.9830	.2212	1.503	97.5
.008300	.03666	.2304	.2264	.2324	1.0266	.9741	.4607	.4772	1.108	.9827	.2225	1.499	96.3
.008400	.03689	.2318	.2277	.2338	1.0270	.9737	.4636	.4803	1.109	.9825	.2237	1.495	95.2
.008500	.03711	.2332	.2290	.2353	1.0273	.9734	.4664	.4834	1.111	.9823	.2250	1.491	94.1
.008600	.03733	.2346	.2303	.2367	1.0276	.9731	.4691	.4865	1.112	.9821	.2262	1.487	93.0
.008700	.03755	.2360	.2317	.2381	1.0280	.9728	.4719	.4896	1.113	.9819	.2275	1.482	91.9
.008800	.03777	.2373	.2330	.2396	1.0283	.9725	.4747	.4927	1.115	.9817	.2287	1.478	90.9
.008900	.03799	.2387	.2343	.2410	1.0286	.9722	.4774	.4957	1.116	.9815	.2300	1.474	89.9

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	$K$	$4\pi d/L$	$\sinh 4\pi d/L$	$\cosh 4\pi d/L$	$n$	$C_0/C_\infty$	$H/H_0$	$M$
.009000	.03821	.2401	.2356	.2424	1.0290	.9718	.4801	.4988	1.118	.9813	.2312	1.471	88.9
.009100	.03842	.2414	.2368	.2438	1.0293	.9815	.4828	.5018	1.119	.9811	.2324	1.467	88.0
.009200	.03864	.2428	.2381	.2452	1.0296	.9712	.4855	.5049	1.120	.9809	.2336	1.463	87.1
.009300	.03885	.2441	.2394	.2465	1.0299	.9709	.4882	.5079	1.122	.9807	.2348	1.459	86.1
.009400	.03906	.2455	.2407	.2479	1.0303	.9706	.4909	.5109	1.123	.9805	.2360	1.456	85.2
.009500	.03928	.2468	.2419	.2493	1.0306	.9703	.4936	.5138	1.124	.9803	.2371	1.452	84.3
.009600	.03949	.2481	.2431	.2507	1.0309	.9700	.4962	.5168	1.126	.9801	.2383	1.448	83.5
.009700	.03970	.2494	.2443	.2520	1.0313	.9697	.4988	.5198	1.127	.9799	.2394	1.445	82.7
.009800	.03990	.2507	.2456	.2534	1.0316	.9694	.5014	.5227	1.128	.9797	.2406	1.442	81.8
.009900	.04011	.2520	.2468	.2547	1.0319	.9691	.5040	.5257	1.130	.9794	.2417	1.438	81.0
.01000	.04032	.2533	.2480	.2560	1.0322	.9688	.5066	.5286	1.131	.9792	.2429	1.435	80.2
.01100	.04233	.2660	.2598	.2691	1.0356	.9656	.5319	.5574	1.145	.9772	.2539	1.403	73.1
.01200	.04426	.2781	.2711	.2817	1.0389	.9625	.5562	.5953	1.159	.9751	.2643	1.375	67.1
.01300	.04612	.2898	.2820	.2938	1.0423	.9594	.5795	.6225	1.173	.9731	.2743	1.350	62.1
.01400	.04791	.3010	.2924	.3056	1.0456	.9564	.6020	.6391	1.187	.9710	.2838	1.327	57.8
.01500	.04964	.3119	.3022	.3170	1.0490	.9533	.6238	.6651	1.201	.9690	.2928	1.307	54.0
.01600	.05132	.3225	.3117	.3281	1.0524	.9502	.6450	.6906	1.215	.9670	.3014	1.288	50.8
.01700	.05296	.3328	.3209	.3389	1.0559	.9471	.6655	.7158	1.230	.9649	.3096	1.271	47.9
.01800	.05455	.3428	.3298	.3495	1.0593	.9440	.6856	.7405	1.244	.9629	.3176	1.255	45.3
.01900	.05611	.3525	.3386	.3599	1.0628	.9409	.7051	.7650	1.259	.9609	.3253	1.240	43.0
.02000	.05763	.3621	.3470	.3701	1.0663	.9378	.7242	.7891	1.274	.9588	.3327	1.226	41.0
.02100	.05912	.3714	.3552	.3800	1.0698	.9348	.7429	.8131	1.289	.9568	.3399	1.213	39.1
.02200	.06057	.3806	.3632	.3898	1.0733	.9317	.7612	.8368	1.304	.9548	.3468	1.201	37.4
.02300	.06200	.3896	.3710	.3995	1.0768	.9287	.7791	.8603	1.319	.9528	.3535	1.189	35.9
.02400	.06340	.3984	.3786	.4090	1.0804	.9256	.7967	.8837	1.335	.9508	.3600	1.178	34.4
.02500	.06478	.4070	.3860	.4184	1.0840	.9225	.8140	.9069	1.350	.9488	.3662	1.168	33.1
.02600	.06613	.4155	.3932	.4276	1.0876	.9195	.8310	.9310	1.366	.9468	.3722	1.159	31.9
.02700	.06747	.4239	.4002	.4367	1.0912	.9164	.8478	.9530	1.381	.9448	.3781	1.150	30.8
.02800	.06878	.4322	.4071	.4457	1.0949	.9133	.8643	.9760	1.397	.9428	.3838	1.141	29.8
.02900	.07007	.4403	.4138	.4546	1.0985	.9103	.8805	.9988	1.413	.9408	.3893	1.133	28.8

$d/\lambda_0$	$d/\lambda$	$2\pi d/\lambda$	$\tan \delta/\lambda$	$\sinh 2\pi d/\lambda$	$\cosh 2\pi d/\lambda$	$\kappa$	$4\pi d/\lambda$	$\sinh 4\pi d/\lambda$	$\cosh 4\pi d/\lambda$	$n$	$c_0/c_0$	$H/H_0$	$M$
.03000	.07135	.4483	.4205	.4634	1.1021	.9073	.8966	1.022	1.430	.9388	.3947	1.125	27.9
.03100	.07260	.4562	.4269	.4721	1.1059	.9042	.9124	1.044	1.446	.9369	.4000	1.118	27.1
.03200	.07385	.4640	.4333	.4808	1.1096	.9012	.9280	1.067	1.462	.9349	.4051	1.111	26.3
.03300	.07507	.4717	.4395	.4894	1.1133	.8982	.9434	1.090	1.479	.9329	.4100	1.104	25.6
.03400	.07630	.4794	.4457	.4980	1.1171	.8952	.9568	1.113	1.496	.9309	.4149	1.098	24.8
.03500	.07748	.4868	.4517	.5064	1.1209	.8921	.9737	1.135	1.513	.9289	.4196	1.092	24.19
.03600	.07867	.4943	.4577	.5147	1.1247	.8891	.9886	1.158	1.530	.9270	.4242	1.086	23.56
.03700	.07984	.5017	.4635	.5230	1.1285	.8861	1.0033	1.180	1.547	.9250	.4287	1.080	22.97
.03800	.08100	.5090	.4691	.5312	1.1324	.8831	1.018	1.203	1.564	.9230	.4330	1.075	22.42
.03900	.08215	.5162	.4747	.5394	1.1362	.8801	1.032	1.226	1.582	.9211	.4372	1.069	21.90
.04000	.08329	.5233	.4802	.5475	1.1401	.8771	1.047	1.248	1.600	.9192	.4414	1.064	21.40
.04100	.08442	.5304	.4857	.5556	1.1440	.8741	1.061	1.271	1.617	.9172	.4455	1.059	20.92
.04200	.08553	.5374	.4911	.5637	1.1479	.8711	1.075	1.294	1.636	.9153	.4495	1.055	20.46
.04300	.08664	.5444	.4964	.5717	1.1518	.8688	1.089	1.317	1.654	.9133	.4534	1.050	20.03
.04400	.08774	.5513	.5015	.5796	1.1558	.8652	1.103	1.340	1.672	.9114	.4571	1.046	19.62
.04500	.08883	.5581	.5066	.5876	1.1599	.8621	1.116	1.363	1.691	.9095	.4607	1.042	19.23
.04600	.08991	.5649	.5116	.5954	1.1639	.8592	1.130	1.386	1.709	.9076	.4643	1.038	18.85
.04700	.09098	.5717	.5166	.6033	1.1679	.8562	1.143	1.409	1.728	.9057	.4679	1.034	18.49
.04800	.09205	.5784	.5215	.6111	1.1720	.8532	1.157	1.433	1.747	.9037	.4713	1.030	18.15
.04900	.09311	.5850	.5263	.6189	1.1760	.8503	1.170	1.456	1.766	.9018	.4746	1.026	17.82
.05000	.09416	.5916	.5310	.6267	1.1802	.8473	1.183	1.479	1.786	.8999	.4779	1.023	17.50
.05100	.09520	.5981	.5357	.6344	1.1843	.8444	1.196	1.503	1.805	.8980	.4811	1.019	17.19
.05200	.09623	.6046	.5403	.6421	1.1884	.8415	1.209	1.526	1.825	.8961	.4842	1.016	16.90
.05300	.09726	.6111	.5449	.6499	1.1926	.8385	1.222	1.550	1.845	.8943	.4873	1.013	16.62
.05400	.09829	.6176	.5494	.6575	1.1968	.8356	1.235	1.574	1.865	.8924	.4903	1.010	16.35
.05500	.09930	.6239	.5538	.6652	1.2011	.8326	1.248	1.598	1.885	.8905	.4932	1.007	16.09
.05600	.1003	.6303	.5582	.6729	1.2053	.8297	1.261	1.622	1.906	.8886	.4960	1.004	15.84
.05700	.1013	.6366	.5626	.6805	1.2096	.8267	1.273	1.646	1.926	.8867	.4988	1.001	15.60
.05800	.1023	.6428	.5668	.6880	1.2138	.8239	1.286	1.670	1.947	.8849	.5015	.9985	15.36
.05900	.1033	.6491	.5711	.6956	1.2181	.8209	1.298	1.695	1.968	.8830	.5042	.9958	15.13

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	$K$	$L\pi d/L$	$\sinh L\pi d/L$	$\cosh L\pi d/L$	$n$	$C_0/C_\infty$	$H/H_0$	$M$
.06000	.1013	.6553	.5753	.7033	1.2225	.8180	1.311	1.719	1.989	.8811	.5068	.9932	14.91
.06100	.1053	.6616	.5794	.7110	1.2270	.8150	1.3231	1.744	2.011	.8792	.5094	.9907	14.70
.06200	.1063	.6678	.5834	.7187	1.2315	.8121	1.336	1.770	2.033	.8773	.5119	.9883	14.50
.06300	.1073	.6739	.5874	.7256	1.2355	.8093	1.348	1.795	2.055	.8755	.5143	.9860	14.30
.06400	.1082	.6799	.5914	.7335	1.2402	.8063	1.360	1.819	2.076	.8737	.5167	.9837	14.11
.06500	.1092	.6860	.5954	.7411	1.2447	.8035	1.372	1.845	2.098	.8719	.5191	.9815	13.92
.06600	.1101	.6920	.5993	.7486	1.2492	.8005	1.384	1.870	2.121	.8700	.5214	.9793	13.74
.06700	.1111	.6981	.6031	.7561	1.2537	.7977	1.396	1.896	2.144	.8682	.5236	.9772	13.57
.06800	.1120	.7037	.6069	.7633	1.2580	.7948	1.408	1.921	2.166	.8664	.5258	.9752	13.40
.06900	.1130	.7099	.6106	.7711	1.2628	.7919	1.420	1.948	2.189	.8646	.5279	.9732	13.24
.07000	.1139	.7157	.6144	.7783	1.2672	.7890	1.432	1.974	2.213	.8627	.5300	.9713	13.08
.07100	.1149	.7219	.6181	.7863	1.2721	.7861	1.444	2.000	2.236	.8609	.5321	.9694	12.92
.07200	.1158	.7277	.6217	.7937	1.2767	.7833	1.455	2.026	2.260	.8591	.5341	.9676	12.77
.07300	.1168	.7336	.6252	.8011	1.2813	.7804	1.467	2.053	2.284	.8572	.5360	.9658	12.62
.07400	.1177	.7395	.6289	.8088	1.2861	.7775	1.479	2.080	2.308	.8554	.5380	.9641	12.48
.07500	.1186	.7453	.6324	.8162	1.2908	.7747	1.490	2.107	2.332	.8537	.5399	.9624	12.34
.07600	.1195	.7511	.6359	.8237	1.2956	.7719	1.502	2.135	2.357	.8519	.5417	.9607	12.21
.07700	.1205	.7569	.6392	.8312	1.3004	.7690	1.514	2.162	2.382	.8501	.5435	.9591	12.08
.07800	.1214	.7625	.6427	.8386	1.3051	.7662	1.525	2.189	2.407	.8483	.5452	.9576	11.95
.07900	.1223	.7683	.6460	.8462	1.3100	.7634	1.537	2.217	2.432	.8465	.5469	.9562	11.83
.08000	.1232	.7741	.6493	.8538	1.3149	.7605	1.548	2.245	2.458	.8448	.5485	.9548	11.71
.08100	.1241	.7799	.6526	.8614	1.3198	.7577	1.560	2.274	2.484	.8430	.5501	.9534	11.59
.08200	.1251	.7854	.6558	.8687	1.3246	.7549	1.571	2.303	2.511	.8413	.5517	.9520	11.47
.08300	.1259	.7911	.6590	.8762	1.3295	.7522	1.583	2.331	2.537	.8395	.5533	.9506	11.36
.08400	.1268	.7967	.6622	.8837	1.3345	.7494	1.594	2.360	2.563	.8378	.5548	.9493	11.25
.08500	.1277	.8026	.6655	.8915	1.3397	.7464	1.605	2.389	2.590	.8360	.5563	.9481	11.14
.08600	.1286	.8080	.6685	.8989	1.3446	.7437	1.616	2.418	2.617	.8342	.5577	.9469	11.04
.08700	.1295	.8137	.6716	.9064	1.3497	.7409	1.628	2.448	2.644	.8325	.5591	.9457	10.94
.08800	.1304	.8193	.6747	.9141	1.3548	.7381	1.639	2.478	2.672	.8308	.5605	.9445	10.84
.08900	.1313	.8250	.6778	.9218	1.3600	.7353	1.650	2.508	2.700	.8290	.5619	.9433	10.74

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	K	$L\pi d/L$	$\sinh L\pi d/L$	$\cosh L\pi d/L$	n	$C_0/C_\infty$	$H/H_0$	M
.09000	.1322	.8306	.6808	.9295	1.3653	.7324	1.661	2.538	2.728	.8273	.5632	.9422	10.65
.09100	.1331	.8363	.6838	.9372	1.3706	.7296	1.672	2.568	2.756	.8255	.5645	.9411	10.55
.09200	.1340	.8420	.6868	.9450	1.3759	.7268	1.684	2.599	2.785	.8238	.5658	.9401	10.46
.09300	.1349	.8474	.6897	.9525	1.3810	.7241	1.695	2.630	2.814	.8221	.5670	.9391	10.37
.09400	.1357	.8528	.6925	.9600	1.3862	.7214	1.706	2.662	2.843	.8204	.5682	.9381	10.29
.09500	.1366	.8583	.6953	.9677	1.3917	.7186	1.717	2.693	2.873	.8187	.5693	.9371	10.21
.09600	.1375	.8639	.6982	.9755	1.3970	.7158	1.728	2.726	2.903	.8170	.5704	.9362	10.12
.09700	.1384	.8694	.7011	.9832	1.4023	.7131	1.739	2.757	2.933	.8153	.5716	.9353	10.04
.09800	.1392	.8749	.7039	.9908	1.4077	.7104	1.750	2.790	2.963	.8136	.5727	.9344	9.962
.09900	.1401	.8803	.7066	.9985	1.4131	.7076	1.761	2.822	2.994	.8120	.5737	.9335	9.884
.1000	.1410	.8858	.7093	1.006	1.4187	.7049	1.772	2.855	3.025	.8103	.5747	.9327	9.808
.1010	.1419	.8913	.7120	1.014	1.4242	.7022	1.783	2.888	3.057	.8086	.5757	.9319	9.734
.1020	.1427	.8967	.7147	1.022	1.4297	.6994	1.793	2.922	3.088	.8069	.5766	.9311	9.661
.1030	.1436	.9023	.7173	1.030	1.4354	.6967	1.805	2.956	3.121	.8052	.5776	.9304	9.590
.1040	.1445	.9076	.7200	1.037	1.4410	.6940	1.815	2.990	3.153	.8036	.5785	.9297	9.519
.1050	.1453	.9130	.7226	1.045	1.4465	.6913	1.826	3.024	3.185	.8019	.5794	.9290	9.451
.1060	.1462	.9184	.7252	1.053	1.4523	.6886	1.837	3.059	3.218	.8003	.5803	.9282	9.384
.1070	.1470	.9239	.7277	1.061	1.4580	.6859	1.848	3.094	3.251	.7986	.5812	.9276	9.318
.1080	.1479	.9293	.7303	1.069	1.4638	.6833	1.858	3.128	3.284	.7970	.5820	.9269	9.254
.1090	.1488	.9343	.7327	1.076	1.4692	.6806	1.869	3.164	3.319	.7954	.5828	.9263	9.191
.1100	.1496	.9400	.7352	1.085	1.4752	.6779	1.880	3.201	3.353	.7937	.5836	.9257	9.129
.1110	.1505	.9456	.7377	1.093	1.4814	.6752	1.891	3.237	3.388	.7920	.5843	.9251	9.068
.1120	.1513	.9508	.7402	1.101	1.4871	.6725	1.902	3.274	3.423	.7904	.5850	.9245	9.009
.1130	.1522	.9563	.7426	1.109	1.4932	.6697	1.913	3.312	3.459	.7888	.5857	.9239	8.950
.1140	.1530	.9616	.7450	1.117	1.4990	.6671	1.923	3.348	3.494	.7872	.5864	.9234	8.891
.1150	.1539	.9670	.7474	1.125	1.5051	.6645	1.934	3.385	3.530	.7856	.5871	.9228	8.835
.1160	.1547	.9720	.7497	1.133	1.5108	.6619	1.944	3.423	3.566	.7840	.5878	.9223	8.780
.1170	.1556	.9775	.7520	1.141	1.5171	.6592	1.955	3.462	3.603	.7824	.5884	.9218	8.726
.1180	.1564	.9827	.7543	1.149	1.5230	.6566	1.966	3.501	3.641	.7808	.5890	.9214	8.673
.1190	.1573	.9882	.7566	1.157	1.5293	.6539	1.977	3.540	3.678	.7792	.5896	.9209	8.621

d/L <sub>0</sub>	d/L	2 $\pi$ d/L	TANH 2 $\pi$ d/L	SINH 2 $\pi$ d/L	COSH 2 $\pi$ d/L	K	4 $\pi$ d/L	SINH 4 $\pi$ d/L	COSH 4 $\pi$ d/L	n	c <sub>0</sub> /c <sub>0</sub>	H/H' <sub>0</sub>	M
.1200	.1581	.9936	.7589	1.165	1.5356	.6512	1.987	3.579	3.716	.7776	.5902	.9204	8.569
.1210	.1590	.9989	.7612	1.174	1.5418	.6486	1.998	3.620	3.755	.7760	.5907	.9200	8.518
.1220	.1598	1.004	.7634	1.182	1.5479	.6460	2.008	3.659	3.793	.7745	.5913	.9196	8.468
.1230	.1607	1.010	.7656	1.190	1.5546	.6433	2.019	3.699	3.832	.7729	.5918	.9192	8.419
.1240	.1615	1.015	.7678	1.198	1.5605	.6407	2.030	3.740	3.871	.7713	.5922	.9189	8.371
.1250	.1624	1.020	.7700	1.207	1.5674	.6381	2.041	3.782	3.912	.7698	.5926	.9186	8.324
.1260	.1632	1.025	.7721	1.215	1.5734	.6356	2.051	3.824	3.952	.7682	.5931	.9182	8.278
.1270	.1640	1.030	.7742	1.223	1.5795	.6331	2.061	3.865	3.992	.7667	.5936	.9178	8.233
.1280	.1649	1.036	.7763	1.231	1.5862	.6305	2.072	3.907	4.033	.7652	.5940	.9175	8.189
.1290	.1657	1.041	.7783	1.240	1.5927	.6279	2.082	3.950	4.074	.7637	.5944	.9172	8.146
.1300	.1665	1.046	.7804	1.248	1.5990	.6254	2.093	3.992	4.115	.7621	.5948	.9169	8.103
.1310	.1674	1.052	.7824	1.257	1.6060	.6228	2.104	4.036	4.158	.7606	.5951	.9166	8.061
.1320	.1682	1.057	.7844	1.265	1.6124	.6202	2.114	4.080	4.201	.7591	.5954	.9164	8.020
.1330	.1691	1.062	.7865	1.273	1.6191	.6176	2.125	4.125	4.245	.7575	.5958	.9161	7.978
.1340	.1699	1.068	.7885	1.282	1.6260	.6150	2.135	4.169	4.288	.7560	.5961	.9158	7.937
.1350	.1708	1.073	.7905	1.291	1.633	.6123	2.146	4.217	4.334	.7545	.5964	.9156	7.897
.1360	.1716	1.078	.7925	1.300	1.640	.6098	2.156	4.262	4.378	.7530	.5967	.9154	7.857
.1370	.1724	1.084	.7945	1.308	1.647	.6073	2.167	4.309	4.423	.7515	.5969	.9152	7.819
.1380	.1733	1.089	.7964	1.317	1.654	.6047	2.177	4.355	4.468	.7500	.5972	.9150	7.781
.1390	.1741	1.094	.7983	1.326	1.660	.6022	2.188	4.402	4.514	.7485	.5975	.9148	7.744
.1400	.1749	1.099	.8002	1.334	1.667	.5998	2.198	4.450	4.561	.7471	.5978	.9146	7.707
.1410	.1758	1.105	.8021	1.343	1.675	.5972	2.209	4.498	4.607	.7456	.5980	.9144	7.671
.1420	.1766	1.110	.8039	1.352	1.681	.5947	2.219	4.546	4.654	.7441	.5982	.9142	7.636
.1430	.1774	1.115	.8057	1.360	1.688	.5923	2.230	4.595	4.663	.7426	.5984	.9141	7.602
.1440	.1783	1.120	.8076	1.369	1.696	.5898	2.240	4.644	4.751	.7412	.5986	.9140	7.567
.1450	.1791	1.125	.8094	1.378	1.703	.5873	2.251	4.695	4.800	.7397	.5987	.9139	7.533
.1460	.1800	1.131	.8112	1.388	1.710	.5847	2.261	4.746	4.850	.7382	.5989	.9137	7.499
.1470	.1808	1.136	.8131	1.397	1.718	.5822	2.272	4.798	4.901	.7368	.5990	.9136	7.465
.1480	.1816	1.141	.8149	1.405	1.725	.5798	2.282	4.847	4.951	.7354	.5992	.9135	7.432
.1490	.1825	1.146	.8166	1.415	1.732	.5773	2.293	4.901	5.001	.7339	.5993	.9134	7.400

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	$K$	$4\pi d/L$	$\sinh 4\pi d/L$	$\cosh 4\pi d/L$	$n$	$C_G/C_0$	$H/H_0$	$M$
1.500	.1833	1.152	.8183	1.424	1.740	.57148	2.303	4.954	5.054	.7325	.5994	.9133	7.369
1.510	.1841	1.157	.8200	1.433	1.747	.5723	2.314	5.007	5.106	.7311	.5994	.9133	7.339
1.520	.1850	1.162	.8217	1.442	1.755	.5699	2.324	5.061	5.159	.7296	.5995	.9132	7.309
1.530	.1858	1.167	.8234	1.451	1.762	.5675	2.335	5.115	5.212	.7282	.5996	.9132	7.279
1.540	.1866	1.173	.8250	1.460	1.770	.5651	2.345	5.169	5.265	.7268	.5996	.9132	7.250
1.550	.1875	1.178	.8267	1.469	1.777	.5627	2.356	5.225	5.320	.7254	.5997	.9131	7.221
1.560	.1883	1.183	.8284	1.479	1.785	.5602	2.366	5.283	5.376	.7240	.5998	.9130	7.191
1.570	.1891	1.188	.8301	1.488	1.793	.5577	2.377	5.339	5.432	.7226	.5999	.9129	7.162
1.580	.1900	1.194	.8317	1.498	1.801	.5552	2.387	5.398	5.490	.7212	.5998	.9130	7.134
1.590	.1908	1.199	.8333	1.507	1.809	.5528	2.398	5.454	5.544	.7198	.5998	.9130	7.107
1.600	.1917	1.204	.8349	1.517	1.817	.5504	2.408	5.513	5.603	.7184	.5998	.9130	7.079
1.610	.1925	1.209	.8365	1.527	1.825	.5480	2.419	5.571	5.660	.7171	.5998	.9130	7.052
1.620	.1933	1.215	.8381	1.536	1.833	.5456	2.429	5.630	5.718	.7157	.5998	.9130	7.026
1.630	.1941	1.220	.8396	1.546	1.841	.5432	2.440	5.690	5.777	.7144	.5998	.9130	7.000
1.640	.1950	1.225	.8411	1.555	1.849	.5409	2.450	5.751	5.837	.7130	.5998	.9130	6.975
1.650	.1958	1.230	.8427	1.565	1.857	.5385	2.461	5.813	5.898	.7117	.5997	.9131	6.949
1.660	.1966	1.235	.8442	1.574	1.865	.5362	2.471	5.874	5.959	.7103	.5996	.9132	6.924
1.670	.1975	1.240	.8457	1.584	1.873	.5339	2.482	5.938	6.021	.7090	.5996	.9132	6.900
1.680	.1983	1.246	.8472	1.594	1.882	.5315	2.492	6.003	6.085	.7076	.5995	.9133	6.876
1.690	.1992	1.251	.8486	1.604	1.890	.5291	2.503	6.066	6.148	.7063	.5994	.9133	6.853
1.700	.2000	1.257	.8501	1.614	1.899	.5267	2.513	6.130	6.212	.7050	.5993	.9134	6.830
1.710	.2008	1.262	.8515	1.624	1.907	.5243	2.523	6.197	6.275	.7036	.5992	.9135	6.807
1.720	.2017	1.267	.8529	1.634	1.915	.5220	2.534	6.262	6.342	.7023	.5991	.9136	6.784
1.730	.2025	1.272	.8544	1.644	1.924	.5197	2.544	6.329	6.407	.7010	.5989	.9137	6.761
1.740	.2033	1.277	.8558	1.654	1.933	.5174	2.555	6.395	6.473	.6997	.5988	.9138	6.738
1.750	.2042	1.282	.8572	1.664	1.941	.5151	2.565	6.465	6.541	.6984	.5987	.9139	6.716
1.760	.2050	1.288	.8586	1.675	1.951	.5127	2.576	6.534	6.610	.6971	.5985	.9140	6.694
1.770	.2058	1.293	.8600	1.685	1.959	.5104	2.586	6.603	6.679	.6958	.5984	.9141	6.672
1.780	.2066	1.298	.8614	1.695	1.968	.5081	2.597	6.672	6.747	.6946	.5982	.9142	6.651
1.790	.2075	1.304	.8627	1.706	1.977	.5058	2.607	6.744	6.818	.6933	.5980	.9144	6.631

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	K	$\downarrow \pi d/L$	$\sinh \downarrow \pi d/L$	$\cosh \downarrow \pi d/L$	n	$C_G/C_0$	$H/H_0$	M
.1800	.2083	1.309	.8640	1.716	1.986	.5036	2.618	6.818	6.891	.6920	.5979	.9145	6.611
.1810	.2092	1.314	.8653	1.727	1.995	.5013	2.629	6.890	6.963	.6907	.5977	.9146	6.591
.1820	.2100	1.320	.8666	1.737	2.004	.4990	2.639	6.963	7.035	.6895	.5975	.9148	6.571
.1830	.2108	1.325	.8680	1.748	2.013	.4967	2.650	7.038	7.109	.6882	.5974	.9149	6.550
.1840	.2117	1.330	.8693	1.758	2.022	.4945	2.660	7.113	7.183	.6870	.5972	.9150	6.530
.1850	.2125	1.335	.8706	1.769	2.032	.4922	2.671	7.191	7.260	.6857	.5969	.9152	6.511
.1860	.2134	1.341	.8718	1.780	2.041	.4899	2.681	7.267	7.336	.6845	.5967	.9154	6.492
.1870	.2142	1.346	.8731	1.791	2.051	.4876	2.692	7.345	7.412	.6832	.5965	.9155	6.474
.1880	.2150	1.351	.8743	1.801	2.060	.4854	2.702	7.421	7.488	.6820	.5963	.9157	6.456
.1890	.2159	1.356	.8755	1.812	2.070	.4832	2.712	7.500	7.566	.6808	.5961	.9159	6.438
.1900	.2167	1.362	.8767	1.823	2.079	.4809	2.723	7.581	7.647	.6796	.5958	.9161	6.421
.1910	.2176	1.367	.8779	1.834	2.089	.4787	2.734	7.663	7.728	.6784	.5955	.9163	6.403
.1920	.2184	1.372	.8791	1.845	2.099	.4765	2.744	7.746	7.810	.6772	.5952	.9165	6.385
.1930	.2192	1.377	.8803	1.856	2.108	.4743	2.755	7.827	7.891	.6760	.5950	.9167	6.368
.1940	.2201	1.383	.8815	1.867	2.118	.4721	2.765	7.911	7.974	.6748	.5948	.9169	6.351
.1950	.2209	1.388	.8827	1.879	2.128	.4699	2.776	7.996	8.059	.6736	.5946	.9170	6.334
.1960	.2218	1.393	.8839	1.890	2.138	.4677	2.787	8.083	8.115	.6724	.5944	.9172	6.317
.1970	.2226	1.399	.8850	1.901	2.148	.4655	2.797	8.167	8.228	.6712	.5941	.9174	6.300
.1980	.2234	1.404	.8862	1.913	2.158	.4633	2.808	8.256	8.316	.6700	.5938	.9176	6.284
.1990	.2243	1.409	.8873	1.924	2.169	.4611	2.819	8.346	8.406	.6689	.5935	.9179	6.268
.2000	.2251	1.414	.8884	1.935	2.178	.4590	2.829	8.436	8.495	.6677	.5932	.9181	6.253
.2010	.2260	1.420	.8895	1.947	2.189	.4569	2.840	8.524	8.583	.6666	.5929	.9183	6.237
.2020	.2268	1.425	.8906	1.959	2.199	.4547	2.850	8.616	8.674	.6654	.5926	.9186	6.222
.2030	.2277	1.430	.8917	1.970	2.210	.4526	2.861	8.708	8.766	.6642	.5923	.9188	6.206
.2040	.2285	1.436	.8928	1.982	2.220	.4504	2.872	8.803	8.860	.6631	.5920	.9190	6.191
.2050	.2293	1.441	.8939	1.994	2.231	.4483	2.882	8.897	8.953	.6620	.5917	.9193	6.176
.2060	.2302	1.446	.8950	2.006	2.242	.4462	2.893	8.994	9.050	.6608	.5914	.9195	6.161
.2070	.2310	1.451	.8960	2.017	2.252	.4441	2.903	9.090	9.144	.6597	.5911	.9197	6.147
.2080	.2319	1.457	.8971	2.030	2.263	.4419	2.914	9.187	9.240	.6586	.5908	.9200	6.133
.2090	.2328	1.462	.8981	2.042	2.274	.4398	2.925	9.288	9.342	.6574	.5905	.9202	6.119

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	K	$4\pi d/L$	$\sinh 4\pi d/L$	$\cosh 4\pi d/L$	n	$C_g/C_0$	$H/H_0$	M
.2100	.2336	1.468	.8991	2.055	2.285	.4377	2.936	9.389	9.442	.6563	.5901	.9205	6.105
.2110	.2344	1.473	.9001	2.066	2.295	.4357	2.946	9.490	9.542	.6552	.5898	.9207	6.091
.2120	.2353	1.479	.9011	2.079	2.307	.4336	2.957	9.590	9.642	.6541	.5894	.9210	6.077
.2130	.2361	1.484	.9021	2.091	2.318	.4315	2.967	9.693	9.744	.6531	.5891	.9213	6.064
.2140	.2370	1.489	.9031	2.103	2.329	.4294	2.978	9.796	9.847	.6520	.5888	.9215	6.051
.2150	.2378	1.494	.9041	2.115	2.340	.4274	2.989	9.902	9.952	.6509	.5884	.9218	6.037
.2160	.2387	1.500	.9051	2.128	2.351	.4253	2.999	10.01	10.06	.6498	.5881	.9221	6.024
.2170	.2395	1.506	.9061	2.142	2.364	.4232	3.010	10.12	10.17	.6488	.5878	.9223	6.011
.2180	.2404	1.511	.9070	2.154	2.375	.4211	3.021	10.23	10.28	.6477	.5874	.9226	5.999
.2190	.2412	1.516	.9079	2.166	2.386	.4191	3.031	10.34	10.38	.6467	.5871	.9228	5.987
.2200	.2421	1.521	.9088	2.178	2.397	.4171	3.042	10.45	10.50	.6456	.5868	.9231	5.975
.2210	.2429	1.526	.9097	2.192	2.409	.4151	3.052	10.56	10.61	.6446	.5864	.9234	5.963
.2220	.2438	1.532	.9107	2.204	2.421	.4131	3.063	10.68	10.72	.6436	.5861	.9236	5.951
.2230	.2446	1.537	.9116	2.218	2.433	.4111	3.074	10.79	10.84	.6425	.5857	.9239	5.939
.2240	.2455	1.542	.9125	2.230	2.444	.4091	3.085	10.91	10.95	.6414	.5854	.9242	5.927
.2250	.2463	1.548	.9134	2.244	2.457	.4071	3.095	11.02	11.07	.6404	.5850	.9245	5.915
.2260	.2472	1.553	.9143	2.257	2.469	.4051	3.106	11.15	11.19	.6394	.5846	.9248	5.903
.2270	.2481	1.559	.9152	2.271	2.481	.4031	3.117	11.27	11.31	.6383	.5842	.9251	5.891
.2280	.2489	1.564	.9161	2.284	2.493	.4011	3.128	11.39	11.44	.6373	.5838	.9254	5.880
.2290	.2498	1.569	.9170	2.297	2.506	.3991	3.138	11.51	11.56	.6363	.5834	.9258	5.869
.2300	.2506	1.575	.9178	2.311	2.518	.3971	3.149	11.64	11.68	.6353	.5830	.9261	5.858
.2310	.2515	1.580	.9186	2.325	2.531	.3952	3.160	11.77	11.81	.6343	.5826	.9264	5.848
.2320	.2523	1.585	.9194	2.338	2.543	.3932	3.171	11.90	11.93	.6333	.5823	.9267	5.838
.2330	.2532	1.591	.9203	2.352	2.556	.3912	3.182	12.03	12.07	.6323	.5819	.9270	5.827
.2340	.2540	1.596	.9211	2.366	2.569	.3893	3.192	12.15	12.19	.6313	.5815	.9273	5.816
.2350	.2549	1.602	.9219	2.380	2.581	.3874	3.203	12.29	12.33	.6304	.5811	.9276	5.806
.2360	.2558	1.607	.9227	2.393	2.594	.3855	3.214	12.43	12.47	.6294	.5807	.9279	5.796
.2370	.2566	1.612	.9235	2.408	2.607	.3836	3.225	12.55	12.59	.6284	.5804	.9282	5.786
.2380	.2575	1.618	.9243	2.422	2.620	.3816	3.236	12.69	12.73	.6275	.5800	.9285	5.776
.2390	.2584	1.623	.9251	2.436	2.634	.3797	3.247	12.83	12.87	.6265	.5796	.9288	5.766

$d/L_{\odot}$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	$K$	${}_4\pi d/L$	$\sinh {}_4\pi d/L$	$\cosh {}_4\pi d/L$	$n$	$c_G/c_{\odot}$	$H/H'_{\odot}$	$M$
.2400	.2592	1.629	.9259	2.450	2.647	.3779	3.257	12.97	13.01	.6256	.5792	.9291	5.756
.2410	.2601	1.634	.9267	2.464	2.660	.3760	3.268	13.11	13.15	.6246	.5788	.9294	5.746
.2420	.2610	1.640	.9275	2.480	2.674	.3741	3.279	13.26	13.30	.6237	.5784	.9298	5.736
.2430	.2618	1.645	.9282	2.494	2.687	.3722	3.290	13.40	13.44	.6228	.5780	.9301	5.727
.2440	.2627	1.650	.9289	2.508	2.700	.3704	3.301	13.55	13.59	.6218	.5776	.9304	5.718
.2450	.2635	1.656	.9296	2.523	2.714	.3685	3.312	13.70	13.73	.6209	.5272	.9307	5.710
.2460	.2644	1.661	.9304	2.538	2.728	.3666	3.323	13.85	13.88	.6200	.5768	.9310	5.701
.2470	.2653	1.667	.9311	2.553	2.742	.3648	3.334	14.00	14.04	.6191	.5764	.9314	5.692
.2480	.2661	1.672	.9318	2.568	2.755	.3629	3.344	14.15	14.19	.6182	.5760	.9317	5.684
.2490	.2670	1.678	.9325	2.583	2.770	.3610	3.355	14.31	14.35	.6173	.5756	.9320	5.675
.2500	.2679	1.683	.9332	2.599	2.784	.3592	3.367	14.47	14.51	.6164	.5752	.9323	5.667
.2510	.2687	1.689	.9339	2.614	2.798	.3574	3.377	14.62	14.66	.6155	.5748	.9327	5.658
.2520	.2696	1.694	.9346	2.629	2.813	.3556	3.388	14.79	14.82	.6146	.5744	.9330	5.650
.2530	.2705	1.700	.9353	2.645	2.828	.3537	3.399	14.95	14.99	.6137	.5740	.9333	5.641
.2540	.2714	1.705	.9360	2.660	2.842	.3519	3.410	15.12	15.15	.6128	.5736	.9336	5.633
.2550	.2722	1.711	.9367	2.676	2.856	.3501	3.421	15.29	15.32	.6120	.5732	.9340	5.624
.2560	.2731	1.716	.9374	2.691	2.871	.3483	3.432	15.45	15.49	.6111	.5728	.9343	5.616
.2570	.2740	1.722	.9381	2.707	2.886	.3465	3.443	15.63	15.66	.6102	.5724	.9346	5.608
.2580	.2749	1.727	.9388	2.723	2.901	.3447	3.454	15.80	15.83	.6093	.5720	.9349	5.600
.2590	.2757	1.732	.9394	2.739	2.916	.3430	3.465	15.97	16.00	.6085	.5716	.9353	5.592
.2600	.2766	1.738	.9400	2.755	2.931	.3412	3.476	16.15	16.18	.6076	.5712	.9356	5.585
.2610	.2775	1.744	.9406	2.772	2.946	.3394	3.487	16.33	16.36	.6068	.5707	.9360	5.578
.2620	.2784	1.749	.9412	2.788	2.962	.3376	3.498	16.51	16.54	.6060	.5703	.9363	5.571
.2630	.2792	1.755	.9418	2.804	2.977	.3359	3.509	16.69	16.73	.6052	.5699	.9367	5.563
.2640	.2801	1.760	.9425	2.820	2.992	.3342	3.520	16.88	16.91	.6043	.5695	.9370	5.556
.2650	.2810	1.766	.9431	2.837	3.008	.3325	3.531	17.07	17.10	.6035	.5691	.9373	5.548
.2660	.2819	1.771	.9437	2.853	3.023	.3308	3.542	17.26	17.28	.6027	.5687	.9377	5.541
.2670	.2827	1.776	.9443	2.870	3.039	.3291	3.553	17.45	17.45	.6018	.5683	.9380	5.534
.2680	.2836	1.782	.9449	2.886	3.055	.3274	3.564	17.64	17.67	.6010	.5679	.9383	5.527
.2690	.2845	1.788	.9455	2.904	3.071	.3256	3.575	17.84	17.87	.6002	.5675	.9386	5.520

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	K	$4\pi d/L$	$\sinh 4\pi d/L$	$\cosh 4\pi d/L$	n	$C_0/C_0$	$H/H_0$	M
.2700	.2854	1.793	.9461	2.921	3.088	.3239	3.587	18.04	18.07	.5994	.5671	.9390	5.513
.2710	.2863	1.799	.9467	2.938	3.104	.3222	3.598	18.24	18.27	.5986	.5667	.9393	5.506
.2720	.2872	1.804	.9473	2.956	3.120	.3205	3.610	18.46	18.49	.5978	.5663	.9396	5.499
.2730	.2880	1.810	.9478	2.973	3.136	.3189	3.620	18.65	18.67	.5971	.5659	.9400	5.493
.2740	.2889	1.815	.9484	2.990	3.153	.3172	3.631	18.86	18.89	.5963	.5655	.9403	5.486
.2750	.2898	1.821	.9490	3.008	3.170	.3155	3.642	19.07	19.10	.5955	.5651	.9406	5.480
.2760	.2907	1.826	.9495	3.025	3.186	.3139	3.653	19.28	19.30	.5947	.5647	.9410	5.474
.2770	.2916	1.832	.9500	3.043	3.203	.3122	3.664	19.49	19.51	.5940	.5643	.9413	5.468
.2780	.2924	1.837	.9505	3.061	3.220	.3106	3.675	19.71	19.74	.5932	.5639	.9416	5.462
.2790	.2933	1.843	.9511	3.079	3.237	.3089	3.686	19.93	19.96	.5925	.5635	.9420	5.456
.2800	.2942	1.849	.9516	3.097	3.254	.3073	3.697	20.16	20.18	.5917	.5631	.9423	5.450
.2810	.2951	1.854	.9521	3.115	3.272	.3057	3.709	20.39	20.41	.5910	.5627	.9426	5.444
.2820	.2960	1.860	.9526	3.133	3.289	.3040	3.720	20.62	20.64	.5902	.5623	.9430	5.438
.2830	.2969	1.866	.9532	3.152	3.307	.3024	3.731	20.85	20.87	.5895	.5619	.9433	5.432
.2840	.2978	1.871	.9537	3.171	3.325	.3008	3.742	21.09	21.11	.5887	.5615	.9436	5.426
.2850	.2987	1.877	.9542	3.190	3.343	.2992	3.754	21.33	21.35	.5880	.5611	.9440	5.420
.2860	.2996	1.882	.9547	3.209	3.361	.2976	3.765	21.57	21.59	.5873	.5607	.9443	5.414
.2870	.3005	1.888	.9552	3.228	3.379	.2959	3.776	21.82	21.84	.5866	.5603	.9446	5.409
.2880	.3014	1.893	.9557	3.246	3.396	.2944	3.787	22.05	22.07	.5859	.5600	.9449	5.403
.2890	.3022	1.899	.9562	3.264	3.414	.2929	3.798	22.30	22.32	.5852	.5596	.9452	5.397
.2900	.3031	1.905	.9567	3.284	3.433	.2913	3.809	22.54	22.57	.5845	.5592	.9456	5.392
.2910	.3040	1.910	.9572	3.303	3.451	.2898	3.821	22.81	22.83	.5838	.5588	.9459	5.386
.2920	.3049	1.916	.9577	3.323	3.471	.2882	3.832	23.07	23.09	.5831	.5584	.9463	5.380
.2930	.3058	1.922	.9581	3.343	3.490	.2866	3.843	23.33	23.35	.5824	.5580	.9466	5.375
.2940	.3067	1.927	.9585	3.362	3.508	.2851	3.855	23.60	23.62	.5817	.5576	.9469	5.371
.2950	.3076	1.933	.9590	3.382	3.527	.2835	3.866	23.86	23.88	.5810	.5572	.9473	5.366
.2960	.3085	1.938	.9594	3.402	3.546	.2820	3.877	24.12	24.15	.5804	.5568	.9476	5.361
.2970	.3094	1.944	.9599	3.422	3.565	.2805	3.888	24.40	24.42	.5797	.5564	.9480	5.356
.2980	.3103	1.950	.9603	3.442	3.585	.2790	3.900	24.68	24.70	.5790	.5560	.9483	5.351
.2990	.3112	1.955	.9607	3.462	3.604	.2775	3.911	24.96	24.98	.5784	.5556	.9486	5.347

$d/L_0$	$d/L$	$2\pi d/L$	$\text{TANH } 2\pi d/L$	$\text{SINH } 2\pi d/L$	$\text{COSH } 2\pi d/L$	K	$4\pi d/L$	$\text{SINH } 4\pi d/L$	$\text{COSH } 4\pi d/L$	n	$C_d/C_0$	$H/H'_0$	M
3000	3121	1.961	.9611	3.483	3.624	.2760	3.922	25.24	25.26	.5777	.5552	.9490	5.342
3010	3130	1.967	.9616	3.503	3.643	.2745	3.933	25.53	25.55	.5771	.5549	.9493	5.337
3020	3139	1.972	.9620	3.524	3.663	.2730	3.945	25.82	25.83	.5764	.5545	.9496	5.332
3030	3148	1.978	.9624	3.545	3.683	.2715	3.956	26.12	26.14	.5758	.5541	.9499	5.328
3040	3157	1.984	.9629	3.566	3.703	.2700	3.968	26.42	26.44	.5751	.5538	.9502	5.323
3050	3166	1.989	.9633	3.587	3.724	.2685	3.979	26.72	26.74	.5745	.5534	.9505	5.318
3060	3175	1.995	.9637	3.609	3.745	.2670	3.990	27.02	27.04	.5739	.5530	.9509	5.314
3070	3184	2.001	.9641	3.630	3.765	.2656	4.002	27.33	27.35	.5732	.5527	.9512	5.309
3080	3193	2.007	.9645	3.651	3.786	.2641	4.013	27.65	27.66	.5726	.5523	.9515	5.305
3090	3202	2.012	.9649	3.673	3.806	.2627	4.024	27.96	27.98	.5720	.5519	.9518	5.300
3100	3211	2.018	.9653	3.694	3.827	.2613	4.036	28.28	28.30	.5714	.5515	.9522	5.296
3110	3220	2.023	.9656	3.716	3.848	.2599	4.047	28.60	28.62	.5708	.5511	.9525	5.292
3120	3230	2.029	.9660	3.738	3.870	.2584	4.058	28.93	28.95	.5701	.5507	.9528	5.288
3130	3239	2.035	.9664	3.760	3.891	.2570	4.070	29.27	29.28	.5695	.5504	.9531	5.284
3140	3248	2.041	.9668	3.782	3.912	.2556	4.081	29.60	29.62	.5689	.5500	.9535	5.280
3150	3257	2.046	.9672	3.805	3.934	.2542	4.093	29.94	29.96	.5683	.5497	.9538	5.276
3160	3266	2.052	.9676	3.828	3.956	.2528	4.104	30.29	30.31	.5678	.5494	.9541	5.272
3170	3275	2.058	.9679	3.851	3.978	.2514	4.116	30.64	30.65	.5672	.5490	.9544	5.268
3180	3284	2.063	.9682	3.873	4.000	.2500	4.127	30.99	31.00	.5666	.5486	.9547	5.264
3190	3294	2.069	.9686	3.896	4.022	.2486	4.139	31.35	31.37	.5660	.5483	.9550	5.260
3200	3302	2.075	.9690	3.919	4.045	.2472	4.150	31.71	31.72	.5655	.5479	.9553	5.256
3210	3311	2.081	.9693	3.943	4.068	.2459	4.161	32.07	32.08	.5649	.5476	.9556	5.252
3220	3321	2.086	.9696	3.966	4.090	.2445	4.173	32.44	32.46	.5643	.5472	.9559	5.249
3230	3330	2.092	.9700	3.990	4.114	.2431	4.185	32.83	32.84	.5637	.5468	.9562	5.245
3240	3339	2.098	.9703	4.014	4.136	.2418	4.196	33.20	33.22	.5632	.5465	.9565	5.241
3250	3349	2.104	.9707	4.038	4.160	.2404	4.208	33.60	33.61	.5627	.5462	.9568	5.237
3260	3357	2.110	.9710	4.061	4.183	.2391	4.219	33.97	33.99	.5621	.5458	.9571	5.234
3270	3367	2.115	.9713	4.085	4.206	.2378	4.231	34.37	34.38	.5616	.5455	.9574	5.231
3280	3376	2.121	.9717	4.110	4.230	.2364	4.242	34.77	34.79	.5610	.5451	.9577	5.227
3290	3385	2.127	.9720	4.135	4.254	.2351	4.254	35.18	35.19	.5605	.5448	.9580	5.223

$d/L_0$	$d/L$	$2\pi d/L$	$\text{TANH } 2\pi d/L$	$\text{SINH } 2\pi d/L$	$\text{COSH } 2\pi d/L$	K	$4\pi d/L$	$\text{SINH } 4\pi d/L$	$\text{COSH } 4\pi d/L$	n	$C_G/C_0$	$H/H_0$	M
3300	3394	2.133	.9723	4.159	4.277	.2338	4.265	35.58	35.59	.5599	.5444	.9583	5.220
3310	3403	2.138	.9726	4.184	4.301	.2325	4.277	35.99	36.00	.5594	.5411	.9586	5.217
3320	3413	2.144	.9729	4.209	4.326	.2312	4.288	36.43	36.43	.5589	.5438	.9589	5.214
3330	3422	2.150	.9732	4.234	4.350	.2299	4.300	36.84	36.85	.5584	.5434	.9592	5.210
3340	3431	2.156	.9735	4.259	4.375	.2286	4.311	37.25	37.27	.5578	.5431	.9595	5.207
3350	3440	2.161	.9738	4.284	4.399	.2273	4.323	37.70	37.72	.5573	.5427	.9598	5.204
3360	3449	2.167	.9741	4.310	4.424	.2260	4.335	38.14	38.15	.5568	.5424	.9601	5.201
3370	3459	2.173	.9744	4.336	4.450	.2247	4.346	38.59	38.60	.5563	.5421	.9604	5.198
3380	3468	2.179	.9747	4.361	4.474	.2235	4.358	39.02	39.04	.5558	.5417	.9607	5.194
3390	3477	2.185	.9750	4.388	4.500	.2222	4.369	39.48	39.49	.5553	.5414	.9610	5.191
3400	3488	2.190	.9753	4.413	4.525	.2210	4.381	39.95	39.96	.5548	.5411	.9613	5.188
3410	3495	2.196	.9756	4.439	4.550	.2198	4.392	40.40	40.41	.5544	.5408	.9615	5.185
3420	3504	2.202	.9758	4.466	4.576	.2185	4.404	40.87	40.89	.5539	.5405	.9618	5.182
3430	3514	2.208	.9761	4.492	4.602	.2173	4.416	41.36	41.37	.5534	.5402	.9621	5.179
3440	3523	2.214	.9764	4.521	4.630	.2160	4.427	41.85	41.84	.5529	.5399	.9623	5.176
3450	3532	2.220	.9767	4.547	4.656	.2148	4.439	42.33	42.34	.5524	.5396	.9626	5.173
3460	3542	2.225	.9769	4.575	4.682	.2136	4.451	42.83	42.84	.5519	.5392	.9629	5.171
3470	3551	2.231	.9772	4.602	4.709	.2124	4.462	43.34	43.35	.5515	.5389	.9632	5.168
3480	3560	2.237	.9775	4.629	4.736	.2111	4.474	43.85	43.86	.5510	.5386	.9635	5.165
3490	3570	2.243	.9777	4.657	4.763	.2099	4.486	44.37	44.40	.5505	.5383	.9638	5.162
3500	3579	2.249	.9780	4.685	4.791	.2087	4.498	44.89	44.80	.5501	.5380	.9640	5.159
3510	3588	2.255	.9782	4.713	4.818	.2076	4.509	45.42	45.43	.5496	.5377	.9643	5.157
3520	3598	2.260	.9785	4.741	4.845	.2064	4.521	45.95	45.96	.5492	.5374	.9646	5.154
3530	3607	2.266	.9787	4.770	4.873	.2052	4.533	46.50	46.51	.5487	.5371	.9648	5.152
3540	3616	2.272	.9790	4.798	4.901	.2040	4.544	47.03	47.04	.5483	.5368	.9651	5.149
3550	3625	2.278	.9792	4.827	4.929	.2029	4.556	47.59	47.60	.5479	.5365	.9654	5.147
3560	3635	2.284	.9795	4.856	4.957	.2017	4.568	48.15	48.16	.5474	.5362	.9657	5.144
3570	3644	2.290	.9797	4.885	4.987	.2005	4.579	48.72	48.73	.5470	.5359	.9659	5.141
3580	3653	2.296	.9799	4.914	5.015	.1994	4.591	49.29	49.30	.5466	.5356	.9662	5.139
3590	3663	2.301	.9801	4.944	5.044	.1983	4.603	49.88	49.89	.5461	.5353	.9665	5.137

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh \frac{2\pi d}{L}$	$\sinh \frac{2\pi d}{L}$	$\cosh \frac{2\pi d}{L}$	$\kappa$	$\frac{1}{L} \frac{dL}{dL}$	$\frac{\sinh}{L} \frac{dL}{L}$	$\frac{\cosh}{L} \frac{dL}{L}$	$n$	$C_0/C_\infty$	$H/H_0$	$M$
3600	3672	2.307	.9804	4.974	5.072	.1972	4.615	50.47	50.48	.5457	.5350	.9667	5.134
3610	3682	2.313	.9806	5.004	5.103	.1960	4.627	51.08	51.09	.5453	.5347	.9670	5.132
3620	3691	2.319	.9808	5.034	5.132	.1949	4.638	51.67	51.67	.5449	.5344	.9673	5.130
3630	3700	2.325	.9811	5.063	5.161	.1938	4.650	52.27	52.28	.5445	.5342	.9675	5.127
3640	3709	2.331	.9813	5.094	5.191	.1926	4.661	52.89	52.90	.5441	.5339	.9677	5.125
3650	3719	2.337	.9815	5.124	5.221	.1915	4.673	53.52	53.53	.5437	.5336	.9680	5.123
3660	3728	2.342	.9817	5.155	5.251	.1904	4.685	54.15	54.16	.5433	.5333	.9683	5.121
3670	3737	2.348	.9819	5.186	5.281	.1894	4.697	54.78	54.79	.5429	.5330	.9686	5.118
3680	3747	2.354	.9821	5.217	5.312	.1883	4.708	55.42	55.43	.5425	.5327	.9688	5.116
3690	3756	2.360	.9823	5.248	5.343	.1872	4.720	56.09	56.10	.5421	.5325	.9690	5.114
3700	3766	2.366	.9825	5.280	5.374	.1861	4.732	56.76	56.77	.5417	.5322	.9693	5.112
3710	3775	2.372	.9827	5.312	5.406	.1850	4.744	57.43	57.44	.5413	.5319	.9696	5.110
3720	3785	2.378	.9830	5.345	5.438	.1839	4.756	58.13	58.14	.5409	.5317	.9698	5.107
3730	3794	2.384	.9832	5.377	5.469	.1828	4.768	58.82	58.83	.5405	.5314	.9700	5.105
3740	3804	2.390	.9834	5.410	5.502	.1818	4.780	59.52	59.53	.5402	.5312	.9702	5.103
3750	3813	2.396	.9835	5.443	5.534	.1807	4.792	60.24	60.25	.5398	.5309	.9705	5.101
3760	3822	2.402	.9837	5.475	5.566	.1797	4.803	60.95	60.95	.5394	.5306	.9707	5.099
3770	3832	2.408	.9839	5.508	5.598	.1786	4.815	61.68	61.68	.5390	.5304	.9709	5.097
3780	3841	2.413	.9841	5.541	5.631	.1776	4.827	62.41	62.42	.5387	.5301	.9712	5.095
3790	3850	2.419	.9843	5.572	5.661	.1766	4.838	63.13	63.14	.5383	.5299	.9714	5.093
3800	3860	2.425	.9845	5.609	5.697	.1756	4.851	63.91	63.91	.5380	.5296	.9717	5.091
3810	3869	2.431	.9847	5.643	5.731	.1745	4.862	64.67	64.67	.5376	.5294	.9719	5.090
3820	3879	2.437	.9848	5.677	5.765	.1735	4.875	65.45	65.46	.5372	.5291	.9721	5.088
3830	3888	2.443	.9850	5.712	5.798	.1725	4.885	66.16	66.17	.5369	.5288	.9724	5.086
3840	3898	2.449	.9852	5.746	5.833	.1715	4.898	67.02	67.03	.5365	.5286	.9726	5.084
3850	3907	2.455	.9854	5.780	5.866	.1705	4.910	67.80	67.81	.5362	.5284	.9728	5.082
3860	3917	2.461	.9855	5.814	5.900	.1695	4.922	68.61	68.62	.5359	.5281	.9730	5.081
3870	3926	2.467	.9857	5.850	5.935	.1685	4.934	69.45	69.46	.5355	.5279	.9732	5.079
3880	3936	2.473	.9859	5.886	5.970	.1675	4.946	70.28	70.29	.5352	.5276	.9735	5.077
3890	3945	2.479	.9860	5.921	6.005	.1665	4.958	71.12	71.13	.5349	.5274	.9737	5.076

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	K	$4\pi d/L$	$\sinh 4\pi d/L$	$\cosh 4\pi d/L$	n	$C_d/C_0$	$H/H'_0$	M
.3900	.3955	2.485	.9862	5.957	6.040	.1656	4.970	71.97	71.98	.5345	.5271	.9739	5.074
.3910	.3964	2.491	.9864	5.993	6.076	.1646	4.982	72.85	72.86	.5342	.5269	.9741	5.072
.3920	.3974	2.497	.9865	6.029	6.112	.1636	4.993	73.72	73.72	.5339	.5267	.9743	5.071
.3930	.3983	2.503	.9867	6.066	6.148	.1627	5.005	74.58	74.59	.5336	.5265	.9745	5.069
.3940	.3993	2.509	.9869	6.103	6.185	.1617	5.017	75.48	75.49	.5332	.5262	.9748	5.067
.3950	.4002	2.515	.9870	6.140	6.221	.1608	5.029	76.40	76.40	.5329	.5260	.9750	5.066
.3960	.4012	2.521	.9872	6.177	6.258	.1598	5.041	77.31	77.32	.5326	.5258	.9752	5.064
.3970	.4021	2.527	.9873	6.215	6.295	.1589	5.053	78.24	78.24	.5323	.5255	.9754	5.063
.3980	.4031	2.532	.9874	6.252	6.332	.1579	5.065	79.19	79.19	.5320	.5253	.9756	5.062
.3990	.4040	2.538	.9876	6.290	6.369	.1570	5.077	80.13	80.13	.5317	.5251	.9758	5.060
.4000	.4050	2.544	.9877	6.329	6.407	.1561	5.089	81.12	81.12	.5314	.5248	.9761	5.058
.4010	.4059	2.550	.9879	6.367	6.445	.1552	5.101	82.07	82.08	.5311	.5246	.9763	5.056
.4020	.4069	2.556	.9880	6.406	6.483	.1542	5.113	83.06	83.06	.5308	.5244	.9765	5.055
.4030	.4078	2.562	.9882	6.444	6.521	.1533	5.125	84.07	84.07	.5305	.5242	.9766	5.053
.4040	.4088	2.568	.9883	6.484	6.561	.1524	5.137	85.11	85.12	.5302	.5240	.9768	5.052
.4050	.4098	2.575	.9885	6.525	6.601	.1515	5.149	86.14	86.14	.5299	.5238	.9770	5.050
.4060	.4107	2.581	.9886	6.564	6.640	.1506	5.161	87.17	87.17	.5296	.5236	.9772	5.049
.4070	.4116	2.586	.9887	6.603	6.679	.1497	5.173	88.20	88.20	.5293	.5234	.9774	5.048
.4080	.4126	2.592	.9889	6.644	6.718	.1488	5.185	89.28	89.28	.5290	.5232	.9776	5.046
.4090	.4136	2.598	.9890	6.684	6.758	.1480	5.197	90.38	90.39	.5287	.5229	.9778	5.045
.4100	.4145	2.604	.9891	6.725	6.799	.1471	5.209	91.44	91.44	.5285	.5227	.9780	5.044
.4110	.4155	2.610	.9892	6.766	6.839	.1462	5.221	92.54	92.55	.5282	.5225	.9782	5.043
.4120	.4164	2.616	.9894	6.806	6.879	.1454	5.233	93.67	93.67	.5279	.5223	.9784	5.041
.4130	.4174	2.623	.9895	6.849	6.921	.1445	5.245	94.83	94.83	.5277	.5221	.9786	5.040
.4140	.4183	2.629	.9896	6.890	6.963	.1436	5.257	95.95	95.96	.5274	.5219	.9788	5.039
.4150	.4193	2.635	.9898	6.932	7.004	.1428	5.269	97.13	97.13	.5271	.5217	.9790	5.037
.4160	.4203	2.641	.9899	6.974	7.046	.1419	5.281	98.29	98.30	.5269	.5215	.9792	5.036
.4170	.4212	2.647	.9900	7.018	7.088	.1411	5.294	99.52	99.52	.5266	.5213	.9794	5.035
.4180	.4222	2.653	.9901	7.060	7.130	.1403	5.305	100.7	100.7	.5263	.5211	.9795	5.034
.4190	.4231	2.659	.9902	7.102	7.173	.1394	5.317	101.9	101.9	.5261	.5209	.9797	5.033

$d/L_{\odot}$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	$K$	$4\pi d/L$	$\sinh 4\pi d/L$	$\cosh 4\pi d/L$	$n$	$c_G/c_{\odot}$	$H/H'_{\odot}$	$M$
.4200	.4241	2.665	.9904	7.146	7.215	.1386	5.329	103.1	103.1	.5258	.5208	.9798	5.031
.4210	.4251	2.671	.9905	7.190	7.259	.1378	5.341	104.4	104.4	.5256	.5206	.9800	5.030
.4220	.4260	2.677	.9906	7.234	7.303	.1369	5.353	105.7	105.7	.5253	.5204	.9802	5.029
.4230	.4270	2.683	.9907	7.279	7.349	.1361	5.366	107.0	107.0	.5251	.5202	.9804	5.028
.4240	.4280	2.689	.9908	7.325	7.392	.1353	5.378	108.3	108.3	.5248	.5200	.9806	5.027
.4250	.4289	2.695	.9909	7.371	7.438	.1345	5.390	109.7	109.7	.5246	.5198	.9808	5.026
.4260	.4298	2.701	.9910	7.412	7.479	.1337	5.402	110.9	110.9	.5244	.5196	.9810	5.025
.4270	.4308	2.707	.9911	7.457	7.524	.1329	5.414	112.2	112.2	.5241	.5195	.9811	5.024
.4280	.4318	2.713	.9912	7.503	7.570	.1321	5.426	113.6	113.6	.5239	.5193	.9812	5.023
.4290	.4328	2.719	.9913	7.550	7.616	.1313	5.438	115.0	115.0	.5237	.5191	.9814	5.022
.4300	.4337	2.725	.9914	7.595	7.661	.1305	5.450	116.4	116.4	.5234	.5189	.9816	5.021
.4310	.4347	2.731	.9915	7.642	7.707	.1298	5.462	117.8	117.8	.5232	.5187	.9818	5.020
.4320	.4356	2.737	.9916	7.688	7.753	.1290	5.474	119.2	119.3	.5230	.5186	.9819	5.019
.4330	.4366	2.743	.9917	7.735	7.800	.1282	5.486	120.7	120.7	.5227	.5184	.9821	5.018
.4340	.4376	2.749	.9918	7.783	7.847	.1274	5.499	122.2	122.2	.5225	.5182	.9823	5.017
.4350	.4385	2.755	.9919	7.831	7.895	.1267	5.511	123.7	123.7	.5223	.5181	.9824	5.016
.4360	.4395	2.762	.9920	7.880	7.943	.1259	5.523	125.2	125.2	.5221	.5179	.9826	5.015
.4370	.4405	2.768	.9921	7.922	7.991	.1251	5.535	126.7	126.7	.5218	.5177	.9828	5.014
.4380	.4414	2.774	.9922	7.975	8.035	.1244	5.547	128.3	128.3	.5216	.5176	.9829	5.013
.4390	.4424	2.780	.9923	8.026	8.088	.1236	5.560	129.9	129.9	.5214	.5174	.9830	5.012
.4400	.4434	2.786	.9924	8.075	8.136	.1229	5.572	131.4	131.4	.5212	.5172	.9832	5.011
.4410	.4443	2.792	.9925	8.124	8.185	.1222	5.584	133.0	133.0	.5210	.5171	.9833	5.010
.4420	.4453	2.798	.9926	8.175	8.236	.1214	5.596	134.7	134.7	.5208	.5169	.9835	5.009
.4430	.4463	2.804	.9927	8.228	8.285	.1207	5.608	136.3	136.3	.5206	.5168	.9836	5.008
.4440	.4472	2.810	.9928	8.274	8.334	.1200	5.620	137.9	137.9	.5204	.5166	.9838	5.007
.4450	.4482	2.816	.9929	8.326	8.387	.1192	5.632	139.6	139.7	.5202	.5165	.9839	5.006
.4460	.4491	2.822	.9930	8.379	8.438	.1185	5.644	141.4	141.4	.5200	.5163	.9841	5.005
.4470	.4501	2.828	.9931	8.427	8.486	.1178	5.657	143.1	143.1	.5198	.5161	.9843	5.005
.4480	.4511	2.834	.9931	8.481	8.540	.1171	5.669	144.8	144.8	.5196	.5160	.9844	5.004
.4490	.4521	2.840	.9932	8.532	8.590	.1164	5.681	146.6	146.6	.5194	.5158	.9846	5.003

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2 d/L$	$K$	$4\pi d/L$	$\sinh 4\pi d/L$	$\cosh 4\pi d/L$	$n$	$C_d/C_0$	$H/H_0$	$M$
.4500	.4531	2.847	.9933	8.585	8.643	.1157	5.693	.448.4	.5192	.5157	.9847	5.002	
.4510	.4540	2.853	.9934	8.638	8.695	.1150	5.705	.450.2	.5190	.5156	.9848	5.001	
.4520	.4550	2.859	.9935	8.693	8.750	.1143	5.717	.452.1	.5188	.5154	.9849	5.000	
.4530	.4560	2.865	.9935	8.747	8.804	.1136	5.730	.454.0	.5186	.5152	.9851	5.000	
.4540	.4569	2.871	.9936	8.797	8.854	.1129	5.742	.455.9	.5184	.5151	.9852	4.999	
.4550	.4579	2.877	.9937	8.853	8.910	.1122	5.754	.457.7	.5182	.5150	.9853	4.998	
.4560	.4589	2.883	.9938	8.910	8.965	.1115	5.766	.459.7	.5181	.5148	.9855	4.997	
.4570	.4599	2.890	.9938	8.965	9.021	.1109	5.779	.461.7	.5179	.5146	.9857	4.997	
.4580	.4608	2.896	.9939	9.016	9.072	.1102	5.791	.463.6	.5177	.5145	.9858	4.996	
.4590	.4618	2.902	.9940	9.074	9.129	.1095	5.803	.465.6	.5175	.5144	.9859	4.995	
.4600	.4628	2.908	.9941	9.132	9.186	.1089	5.815	.467.7	.5173	.5143	.9860	4.994	
.4610	.4637	2.914	.9941	9.183	9.238	.1083	5.827	.469.7	.5172	.5141	.9862	4.994	
.4620	.4647	2.920	.9942	9.242	9.296	.1076	5.840	.471.8	.5170	.5140	.9863	4.993	
.4630	.4657	2.926	.9943	9.301	9.354	.1069	5.852	.473.9	.5168	.5139	.9864	4.992	
.4640	.4666	2.932	.9944	9.353	9.406	.1063	5.864	.476.0	.5167	.5138	.9865	4.991	
.4650	.4676	2.938	.9944	9.413	9.466	.1056	5.876	.478.2	.5165	.5136	.9867	4.991	
.4660	.4686	2.944	.9945	9.472	9.525	.1050	5.888	.480.4	.5163	.5135	.9868	4.990	
.4670	.4695	2.951	.9946	9.533	9.585	.1043	5.900	.482.6	.5162	.5134	.9869	4.989	
.4680	.4705	2.957	.9946	9.586	9.638	.1037	5.912	.484.8	.5160	.5132	.9871	4.989	
.4690	.4715	2.963	.9947	9.647	9.699	.1031	5.925	.487.2	.5158	.5131	.9872	4.988	
.4700	.4725	2.969	.9947	9.709	9.760	.1025	5.937	.489.5	.5157	.5129	.9873	4.988	
.4710	.4735	2.975	.9948	9.770	9.821	.1018	5.949	.491.8	.5155	.5128	.9874	4.987	
.4720	.4744	2.981	.9949	9.826	9.877	.1012	5.962	.494.2	.5154	.5127	.9875	4.986	
.4730	.4754	2.987	.9949	9.888	9.938	.1006	5.974	.496.5	.5152	.5126	.9876	4.986	
.4740	.4764	2.993	.9950	9.951	10.00	.1000	5.986	.499.0	.5150	.5125	.9877	4.985	
.4750	.4774	2.999	.9951	10.01	10.07	.09942	5.999	.501.4	.5149	.5124	.9878	4.984	
.4760	.4783	3.005	.9951	10.07	10.12	.09882	6.011	.503.9	.5147	.5122	.9880	4.984	
.4770	.4793	3.012	.9952	10.13	10.18	.09820	6.023	.506.5	.5146	.5121	.9881	4.983	
.4780	.4803	3.018	.9952	10.20	10.25	.09759	6.036	.509.0	.5144	.5120	.9882	4.983	
.4790	.4813	3.024	.9953	10.26	10.31	.09698	6.048	.511.7	.5143	.5119	.9883	4.982	

$d/L_{\odot}$	$d/L$	$2\pi d/L$	$\tanh \frac{2\pi d}{L}$	$\sinh \frac{2\pi d}{L}$	$\cosh \frac{2\pi d}{L}$	$K$	$4\pi d/L$	$\sinh \frac{4\pi d}{L}$	$\cosh \frac{4\pi d}{L}$	$n$	$C_G/C_{\odot}$	$H/H'_{\odot}$	$M$
.4800	.4822	3.030	.9953	10.32	10.37	.09641	6.060	214.2	214.2	.5142	.5117	.9885	4.982
.4810	.4832	3.036	.9954	10.39	10.43	.09583	6.072	216.8	216.8	.5140	.5116	.9886	4.981
.4820	.4842	3.042	.9955	10.45	10.50	.09523	6.085	219.5	219.5	.5139	.5115	.9887	4.980
.4830	.4852	3.049	.9955	10.52	10.57	.09464	6.097	222.2	222.2	.5137	.5114	.9888	4.980
.4840	.4862	3.055	.9956	10.59	10.63	.09405	6.109	225.0	225.0	.5136	.5113	.9889	4.979
.4850	.4871	3.061	.9956	10.65	10.69	.09352	6.121	228.3	228.3	.5134	.5112	.9890	4.979
.4860	.4881	3.067	.9957	10.71	10.76	.09294	6.134	230.6	230.6	.5133	.5111	.9891	4.978
.4870	.4891	3.073	.9957	10.78	10.83	.09236	6.146	233.5	233.5	.5132	.5110	.9892	4.978
.4880	.4901	3.079	.9958	10.85	10.90	.09178	6.159	236.4	236.4	.5130	.5109	.9893	4.977
.4890	.4911	3.086	.9958	10.92	10.96	.09121	6.171	239.6	239.6	.5129	.5107	.9895	4.977
.4900	.4920	3.092	.9959	10.99	11.03	.09064	6.183	242.3	242.3	.5128	.5106	.9896	4.976
.4910	.4930	3.098	.9959	11.05	11.09	.09010	6.195	245.2	245.2	.5126	.5105	.9897	4.976
.4920	.4940	3.104	.9960	11.12	11.16	.08956	6.208	248.3	248.3	.5125	.5104	.9898	4.975
.4930	.4950	3.110	.9960	11.19	11.24	.08901	6.220	251.3	251.3	.5124	.5103	.9899	4.975
.4940	.4960	3.117	.9961	11.26	11.31	.08845	6.232	254.5	254.5	.5122	.5102	.9899	4.974
.4950	.4969	3.122	.9961	11.32	11.37	.08793	6.245	257.6	257.6	.5121	.5101	.9900	4.974
.4960	.4979	3.128	.9962	11.40	11.44	.08741	6.257	260.8	260.8	.5120	.5100	.9901	4.973
.4970	.4989	3.135	.9962	11.47	11.51	.08691	6.269	264.0	264.0	.5119	.5099	.9902	4.973
.4980	.4999	3.141	.9963	11.54	11.59	.08637	6.282	267.3	267.3	.5118	.5098	.9903	4.972
.4990	.5009	3.147	.9963	11.61	11.65	.08584	6.294	270.6	270.6	.5116	.5097	.9904	4.972
.5000	.5018	3.153	.9964	11.68	11.72	.08530	6.306	274.0	274.0	.5115	.5096	.9905	4.971
.5010	.5028	3.159	.9964	11.75	11.80	.08477	6.319	277.5	277.5	.5114	.5095	.9906	4.971
.5020	.5038	3.166	.9964	11.83	11.87	.08424	6.331	280.8	280.8	.5113	.5094	.9907	4.971
.5030	.5048	3.172	.9965	11.91	11.95	.08371	6.343	284.3	284.3	.5112	.5093	.9908	4.970
.5040	.5058	3.178	.9965	11.98	12.02	.08320	6.356	287.9	287.9	.5110	.5092	.9909	4.970
.5050	.5067	3.184	.9966	12.05	12.09	.08270	6.368	291.4	291.4	.5109	.5092	.9909	4.969
.5060	.5077	3.190	.9966	12.12	12.16	.08220	6.380	295.0	295.0	.5108	.5091	.9910	4.969
.5070	.5087	3.196	.9967	12.20	12.24	.08169	6.393	298.7	298.7	.5107	.5090	.9911	4.968
.5080	.5097	3.203	.9967	12.28	12.32	.08119	6.405	302.4	302.4	.5106	.5089	.9912	4.968
.5090	.5107	3.209	.9968	12.35	12.39	.08068	6.417	306.2	306.2	.5105	.5088	.9913	4.967

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	$K$	$4\pi d/L$	$\sinh 4\pi d/L$	$\cosh 4\pi d/L$	$n$	$C_0/C_\infty$	$H/H'_0$	$M$
	.5100												
	.5117	3.215	.9968	12.43	12.47	.08022	6.430	310.0	310.0	.5104	.5087	.9914	4.967
	.5126	3.221	.9968	12.50	12.54	.07972	6.442	313.8	313.8	.5103	.5086	.9915	4.967
	.5136	3.227	.9969	12.58	12.62	.07922	6.454	317.7	317.7	.5102	.5086	.9915	4.966
	.5130	3.233	.9969	12.66	12.70	.07873	6.467	321.7	321.7	.5101	.5085	.9916	4.966
	.5140	3.240	.9970	12.74	12.78	.07824	6.479	325.7	325.7	.5100	.5084	.9917	4.965
	.5166	3.246	.9970	12.82	12.86	.07776	6.491	329.7	329.7	.5098	.5083	.9918	4.965
	.5160	3.252	.9970	12.90	12.94	.07729	6.504	333.8	333.8	.5097	.5082	.9919	4.965
	.5170	3.258	.9971	12.98	13.02	.07682	6.516	337.9	337.9	.5096	.5082	.9919	4.964
	.5180	3.264	.9971	13.06	13.10	.07634	6.529	342.2	342.2	.5095	.5081	.9920	4.964
	.5205	3.270	.9971	13.14	13.18	.07587	6.541	346.4	346.4	.5094	.5080	.9921	4.964
	.5215	3.277	.9972	13.22	13.26	.07540	6.553	350.7	350.7	.5093	.5079	.9922	4.963
	.5225	3.283	.9972	13.31	13.35	.07494	6.566	355.1	355.1	.5092	.5078	.9923	4.963
	.5235	3.289	.9972	13.39	13.43	.07449	6.578	359.6	359.6	.5092	.5077	.9924	4.963
	.5244	3.295	.9973	13.47	13.51	.07404	6.590	364.0	364.0	.5091	.5077	.9924	4.962
	.5254	3.301	.9973	13.55	13.59	.07358	6.603	368.5	368.5	.5090	.5076	.9925	4.962
	.5264	3.308	.9973	13.64	13.68	.07312	6.615	373.1	373.1	.5089	.5075	.9926	4.962
	.5274	3.314	.9974	13.73	13.76	.07266	6.628	377.8	377.8	.5088	.5074	.9927	4.961
	.5284	3.320	.9974	13.81	13.85	.07221	6.640	382.5	382.5	.5087	.5074	.9927	4.961
	.5294	3.326	.9974	13.90	13.94	.07177	6.652	387.3	387.3	.5086	.5073	.9928	4.961
	.5304	3.333	.9975	13.99	14.02	.07134	6.665	392.2	392.2	.5085	.5072	.9929	4.960
	.5314	3.339	.9975	14.07	14.10	.07091	6.677	397.0	397.0	.5084	.5071	.9930	4.960
	.5323	3.345	.9975	14.16	14.19	.07047	6.690	402.0	402.0	.5083	.5070	.9931	4.960
	.5333	3.351	.9976	14.25	14.28	.07003	6.702	406.9	406.9	.5082	.5070	.9931	4.959
	.5343	3.357	.9976	14.34	14.37	.06959	6.714	412.0	412.0	.5082	.5069	.9932	4.959
	.5353	3.363	.9976	14.43	14.46	.06915	6.727	417.2	417.2	.5081	.5068	.9933	4.959
	.5363	3.370	.9976	14.52	14.55	.06872	6.739	422.4	422.4	.5080	.5068	.9933	4.959
	.5373	3.376	.9977	14.61	14.64	.06829	6.752	427.7	427.7	.5079	.5067	.9934	4.958
	.5383	3.382	.9977	14.70	14.73	.06787	6.764	433.1	433.1	.5078	.5066	.9935	4.958
	.5393	3.388	.9977	14.79	14.82	.06746	6.776	438.5	438.5	.5077	.5066	.9935	4.958
	.5402	3.394	.9977	14.88	14.91	.06705	6.789	444.0	444.0	.5077	.5065	.9936	4.958

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	$K$	$4\pi d/L$	$\sinh 4\pi d/L$	$\cosh 4\pi d/L$	$n$	$C_0/C_0$	$H/H_0$	$M$
.5400	.5412	3.401	.9978	14.97	15.01	.06664	6.801	449.5	449.5	.5076	.5065	.9936	4.957
.5410	.5422	3.407	.9978	15.07	15.10	.06623	6.814	455.1	455.1	.5075	.5064	.9937	4.957
.5420	.5432	3.413	.9978	15.16	15.19	.06582	6.826	460.7	460.7	.5074	.5063	.9938	4.957
.5430	.5442	3.419	.9979	15.25	15.29	.06542	6.838	466.4	466.4	.5073	.5063	.9938	4.956
.5440	.5452	3.426	.9979	15.35	15.38	.06501	6.851	472.2	472.2	.5073	.5062	.9939	4.956
.5450	.5461	3.432	.9979	15.45	15.48	.06461	6.863	478.1	478.1	.5072	.5061	.9940	4.956
.5460	.5471	3.438	.9979	15.54	15.58	.06420	6.876	484.3	484.3	.5071	.5060	.9941	4.956
.5470	.5481	3.444	.9980	15.64	15.67	.06380	6.888	490.3	490.3	.5070	.5060	.9941	4.955
.5480	.5491	3.450	.9980	15.74	15.77	.06341	6.901	496.4	496.4	.5070	.5059	.9942	4.955
.5490	.5501	3.456	.9980	15.84	15.87	.06302	6.913	502.5	502.5	.5069	.5059	.9942	4.955
.5500	.5511	3.463	.9980	15.94	15.97	.06263	6.925	508.7	508.7	.5068	.5058	.9942	4.955
.5510	.5521	3.469	.9981	16.04	16.07	.06224	6.937	515.0	515.0	.5067	.5058	.9942	4.954
.5520	.5531	3.475	.9981	16.14	16.17	.06186	6.950	521.6	521.6	.5067	.5057	.9943	4.954
.5530	.5541	3.481	.9981	16.24	16.27	.06148	6.962	528.1	528.1	.5066	.5056	.9944	4.954
.5540	.5551	3.488	.9981	16.34	16.37	.06110	6.975	534.8	534.8	.5065	.5056	.9944	4.954
.5550	.5560	3.494	.9982	16.44	16.47	.06073	6.987	541.4	541.4	.5065	.5056	.9945	4.953
.5560	.5570	3.500	.9982	16.54	16.57	.06035	7.000	548.1	548.1	.5064	.5055	.9945	4.953
.5570	.5580	3.506	.9982	16.65	16.68	.05997	7.012	554.9	554.9	.5063	.5054	.9946	4.953
.5580	.5590	3.512	.9982	16.75	16.78	.05960	7.025	562.0	562.0	.5063	.5053	.9947	4.953
.5590	.5600	3.519	.9982	16.85	16.88	.05923	7.037	569.1	569.1	.5062	.5053	.9947	4.953
.5600	.5610	3.525	.9983	16.96	16.99	.05887	7.050	576.1	576.1	.5061	.5053	.9947	4.952
.5610	.5620	3.531	.9983	17.06	17.09	.05850	7.062	583.3	583.3	.5061	.5052	.9948	4.952
.5620	.5630	3.537	.9983	17.17	17.20	.05814	7.074	590.7	590.7	.5060	.5051	.9949	4.952
.5630	.5640	3.543	.9983	17.28	17.31	.05778	7.087	598.0	598.0	.5059	.5051	.9949	4.952
.5640	.5649	3.550	.9984	17.38	17.41	.05743	7.099	605.0	605.0	.5059	.5050	.9950	4.951
.5650	.5659	3.556	.9984	17.49	17.52	.05707	7.112	613.2	613.2	.5058	.5050	.9950	4.951
.5660	.5669	3.562	.9984	17.60	17.63	.05672	7.124	620.8	620.8	.5057	.5049	.9951	4.951
.5670	.5679	3.568	.9984	17.71	17.74	.05637	7.136	628.5	628.5	.5057	.5049	.9951	4.951
.5680	.5689	3.575	.9984	17.82	17.85	.05602	7.149	636.4	636.4	.5056	.5048	.9952	4.951
.5690	.5699	3.581	.9985	17.94	17.97	.05567	7.161	644.3	644.3	.5056	.5048	.9952	4.950

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh \frac{\sinh}{2\pi d/L}$	$\frac{\sinh}{2\pi d/L}$	$\cosh \frac{\sinh}{2\pi d/L}$	$K$	$\frac{\sinh}{4\pi d/L}$	$\frac{\cosh}{4\pi d/L}$	$n$	$C_0/C_\infty$	$H/H_0$	$M$
.5700	.5709	3.587	.9985	18.05	18.08	.05532	7.174	652.4	.5055	.5047	.9953	4.950
.5710	.5719	3.593	.9985	18.16	18.19	.05497	7.186	660.5	.5054	.5047	.9953	4.950
.5720	.5729	3.600	.9985	18.28	18.31	.05463	7.199	668.8	.5054	.5046	.9954	4.950
.5730	.5738	3.606	.9985	18.39	18.42	.05430	7.211	677.2	.5053	.5046	.9954	4.950
.5740	.5748	3.612	.9985	18.50	18.53	.05396	7.224	685.6	.5053	.5045	.9955	4.950
.5750	.5758	3.618	.9986	18.62	18.64	.05363	7.236	694.3	.5052	.5045	.9955	4.949
.5760	.5768	3.624	.9986	18.73	18.76	.05330	7.249	703.2	.5052	.5044	.9956	4.949
.5770	.5778	3.630	.9986	18.85	18.88	.05297	7.261	711.9	.5051	.5044	.9956	4.949
.5780	.5788	3.637	.9986	18.97	19.00	.05264	7.274	720.8	.5051	.5043	.9957	4.949
.5790	.5798	3.643	.9986	19.09	19.12	.05231	7.286	729.9	.5050	.5043	.9957	4.949
.5800	.5808	3.649	.9987	19.21	19.24	.05198	7.298	739.0	.5049	.5043	.9957	4.948
.5810	.5818	3.656	.9987	19.33	19.36	.05166	7.311	748.1	.5049	.5042	.9958	4.948
.5820	.5828	3.662	.9987	19.45	19.48	.05134	7.323	757.5	.5048	.5042	.9958	4.948
.5830	.5838	3.668	.9987	19.58	19.60	.05102	7.336	767.0	.5048	.5041	.9959	4.948
.5840	.5848	3.674	.9987	19.70	19.73	.05070	7.348	776.7	.5047	.5041	.9959	4.948
.5850	.5858	3.680	.9987	19.81	19.84	.05040	7.361	786.5	.5047	.5040	.9960	4.948
.5860	.5867	3.686	.9987	19.94	19.96	.05009	7.373	796.4	.5046	.5040	.9960	4.948
.5870	.5877	3.693	.9988	20.06	20.09	.04978	7.386	806.5	.5046	.5040	.9960	4.947
.5880	.5887	3.699	.9988	20.19	20.21	.04947	7.398	816.5	.5045	.5039	.9961	4.947
.5890	.5897	3.705	.9988	20.32	20.34	.04916	7.411	826.7	.5045	.5039	.9961	4.947
.5900	.5907	3.712	.9988	20.45	20.47	.04885	7.423	837.1	.5044	.5038	.9962	4.947
.5910	.5917	3.718	.9988	20.57	20.60	.04855	7.436	847.6	.5044	.5038	.9962	4.947
.5920	.5927	3.724	.9988	20.70	20.73	.04824	7.448	858.2	.5043	.5037	.9963	4.947
.5930	.5937	3.730	.9989	20.83	20.86	.04794	7.460	868.9	.5043	.5037	.9963	4.946
.5940	.5947	3.737	.9989	20.97	20.99	.04764	7.473	879.8	.5043	.5037	.9963	4.946
.5950	.5957	3.743	.9989	21.10	21.12	.04735	7.485	890.8	.5042	.5036	.9964	4.946
.5960	.5967	3.749	.9989	21.23	21.25	.04706	7.498	901.9	.5042	.5036	.9964	4.946
.5970	.5977	3.755	.9989	21.35	21.37	.04677	7.510	913.4	.5041	.5036	.9964	4.946
.5980	.5987	3.761	.9989	21.49	21.51	.04648	7.523	925.0	.5041	.5035	.9965	4.946
.5990	.5996	3.767	.9989	21.62	21.64	.04619	7.535	936.5	.5040	.5035	.9965	4.946

$d/L$	$d/L$	$2\pi d/L$	$\tanh \frac{2\pi d}{L}$	$\sinh \frac{2\pi d}{L}$	$\cosh \frac{2\pi d}{L}$	$K$	$L\pi d/L$	$\sinh \frac{L\pi d}{L}$	$\cosh \frac{L\pi d}{L}$	$n$	$c_g/c$	$H/H'$	$M$
.6000	.6006	3.774	.9990	21.76	21.78	.04591	7.548	948.1	948.1	.5040	.5035	.9965	4.945
.6100	.6106	3.836	.9991	23.17	23.19	.04313	7.673	1,074	1,074	.5036	.5031	.9969	4.944
.6200	.6205	3.899	.9992	24.66	24.68	.04052	7.798	1,217	1,217	.5032	.5028	.9972	4.943
.6300	.6305	3.961	.9993	26.25	26.27	.03806	7.923	1,379	1,379	.5029	.5025	.9975	4.942
.6400	.6404	4.024	.9994	27.95	27.97	.03576	8.048	1,527	1,527	.5026	.5023	.9977	4.941
.6500	.6504	4.086	.9994	29.75	29.77	.03359	8.173	1,771	1,771	.5023	.5020	.9980	4.940
.6600	.6603	4.149	.9995	31.68	31.69	.03155	8.298	2,008	2,008	.5021	.5018	.9982	4.940
.6700	.6703	4.212	.9996	33.74	33.74	.02964	8.423	2,275	2,275	.5019	.5017	.9983	4.939
.6800	.6803	4.274	.9996	35.90	35.92	.02784	8.548	2,579	2,579	.5017	.5015	.9985	4.939
.6900	.6902	4.337	.9997	38.23	38.24	.02615	8.674	2,923	2,923	.5015	.5013	.9987	4.938
.7000	.7002	4.400	.9997	40.71	40.72	.02456	8.799	3,314	3,314	.5013	.5012	.9988	4.938
.7100	.7102	4.462	.9997	43.34	43.35	.02307	8.925	3,757	3,757	.5012	.5011	.9989	4.937
.7200	.7202	4.525	.9998	46.14	46.15	.02167	9.050	4,258	4,258	.5011	.5010	.9990	4.937
.7300	.7302	4.588	.9998	49.13	49.14	.02035	9.175	4,828	4,828	.5010	.5009	.9991	4.937
.7400	.7401	4.650	.9998	52.31	52.32	.01911	9.301	5,473	5,473	.5009	.5008	.9992	4.937
.7500	.7501	4.713	.9998	55.70	55.71	.01795	9.426	6,204	6,204	.5008	.5007	.9993	4.936
.7600	.7601	4.776	.9999	59.31	59.31	.01686	9.552	7,034	7,034	.5007	.5006	.9994	4.936
.7700	.7701	4.839	.9999	63.15	63.16	.01583	9.677	7,976	7,976	.5006	.5005	.9995	4.936
.7800	.7801	4.902	.9999	67.24	67.25	.01487	9.803	9,042	9,042	.5005	.5004	.9996	4.936
.7900	.7901	4.964	.9999	71.60	71.60	.01397	9.929	10,250	10,250	.5005	.5004	.9996	4.936
.8000	.8001	5.027	.9999	76.24	76.24	.01312	10.05	11,620	11,620	.5004	.5004	.9996	4.936
.8100	.8101	5.090	.9999	81.18	81.19	.01232	10.18	13,180	13,180	.5004	.5004	.9996	4.936
.8200	.8201	5.153	.9999	86.44	86.44	.01157	10.31	14,940	14,940	.5003	.5003	.9997	4.935
.8300	.8301	5.215	.9999	92.04	92.05	.01086	10.43	17,340	17,340	.5003	.5003	.9997	4.935
.8400	.8400	5.278	1.000	98.00	98.01	.01020	10.56	19,210	19,210	.5003	.5003	.9997	4.935
.8500	.8500	5.341	1.000	104.4	104.4	.009582	10.68	21,780	21,780	.5002	.5002	.9998	4.935
.8600	.8600	5.404	1.000	111.1	111.1	.009000	10.81	24,690	24,690	.5002	.5002	.9998	4.935
.8700	.8700	5.467	1.000	118.3	118.3	.008451	10.93	28,000	28,000	.5002	.5002	.9998	4.935
.8800	.8800	5.529	1.000	126.0	126.0	.007934	11.06	31,750	31,750	.5002	.5002	.9998	4.935
.8900	.8900	5.592	1.000	134.2	134.2	.007454	11.18	36,000	36,000	.5002	.5002	.9998	4.935

$d/L_0$	$d/L$	$2\pi d/L$	$\tanh \frac{2\pi d}{L}$	$\sinh \frac{2\pi d}{L}$	$\cosh \frac{2\pi d}{L}$	$K$	$L_1 \pi d/L$	$\sinh \frac{L_1 \pi d}{L}$	$\cosh \frac{L_1 \pi d}{L}$	$n$	$C_G/C_0$	$H/H_0$	$M$
.9000	.9000	5.655	1.000	142.9	142.9	.007000	11.31	40.810	40.810	.5001	.5001	.9999	4.935
.9100	.9100	5.718	1.000	152.1	152.1	.006574	11.44	46.280	46.280	.5001	.5001	.9999	4.935
.9200	.9200	5.781	1.000	162.0	162.0	.006173	11.56	52.470	52.470	.5001	.5001	.9999	4.935
.9300	.9300	5.844	1.000	172.5	172.5	.005797	11.69	59.500	59.500	.5001	.5001	.9999	4.935
.9400	.9400	5.906	1.000	183.7	183.7	.005445	11.81	67.470	67.470	.5001	.5001	.9999	4.935
.9500	.9500	5.969	1.000	195.6	195.6	.005113	11.94	76.490	76.490	.5001	.5001	.9999	4.935
.9600	.9600	6.032	1.000	203.5	203.5	.004914	12.06	86.740	86.740	.5001	.5001	.9999	4.935
.9700	.9700	6.095	1.000	222.8	222.8	.004489	12.19	98.350	98.350	.5001	.5001	.9999	4.935
.9800	.9800	6.158	1.000	236.1	236.1	.004235	12.32	111.500	111.500	.5001	.5001	.9999	4.935
.9900	.9900	6.220	1.000	251.4	251.4	.003977	12.44	126.500	126.500	.5000	.5000	1.000	4.935
1.000	1.000	6.283	1.000	267.7	267.7	.003735	12.57	143.400	143.400	.5000	.5000	1.000	4.935

TABLE II

FUNCTIONS OF  $d/L$  FOR EVEN INCREMENTS OF  $d/L$ 

from 0.0001 to 0.2890

(This covers the region where interpolation of  $d/L$  in Table I is inconvenient. Values of  $d/L$  of 0.2890 to 1.0000 can be obtained from Table I by interpolation.)

$d/L$	$d/L_0$	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	$\kappa$	$4\pi d/L$	$\sinh 4\pi d/L$	$\cosh 4\pi d/L$	$n$	$C_d/C_0$	$H/H_0$	$M$
0	0	0	0	0	1.0000	1.000	0	0	1.000	1.000	0	$\infty$	$\infty$
.0000000	.0000000												
.0001000	.6283	.0006283	.0006283	.0006283	1.0000	1.000	.001257	.001257	1.000	1.000	.0006283	28.21	12,500,000
.0002000	.2514	.001257	.001257	.001257	1.0000	1.000	.002513	.002513	1.000	1.000	.001257	19.95	3,125,000
.0003000	.5655	.001885	.001885	.001885	1.0000	1.000	.003770	.003770	1.000	1.000	.001885	16.29	1,389,000
.0004000	.1005	.002513	.002513	.002513	1.0000	1.000	.005027	.005027	1.000	1.000	.002513	14.10	781,300
.0005000	.1571	.003142	.003142	.003142	1.0000	1.000	.006283	.006283	1.000	1.000	.003142	12.62	500,000
.0006000	.2262	.003770	.003770	.003770	1.0000	1.000	.007540	.007540	1.000	1.000	.003770	11.52	347,200
.0007000	.3079	.004398	.004398	.004398	1.0000	1.000	.008796	.008797	1.000	1.000	.004398	10.66	255,100
.0008000	.4022	.005027	.005027	.005027	1.0000	1.000	.01005	.01005	1.000	1.000	.005026	9.974	195,300
.0009000	.5090	.005655	.005655	.005655	1.0000	1.000	.01131	.01131	1.000	1.000	.005655	9.403	154,300
.001000	.6283	.006283	.006283	.006283	1.0000	1.000	.01257	.01257	1.000	1.000	.006283	8.921	125,000
.001100	.7603	.006912	.006911	.006912	1.0000	1.000	.01382	.01382	1.000	1.000	.006911	8.506	103,300
.001200	.9048	.007540	.007540	.007540	1.0000	1.000	.01508	.01508	1.000	1.000	.007540	8.114	86,810
.001300	.00001062	.008168	.008168	.008168	1.0000	1.000	.01634	.01634	1.000	1.000	.008168	7.824	73,970
.001400	.00001231	.008796	.008796	.008797	1.0000	1.000	.01759	.01759	1.000	1.000	.008796	7.539	63,780
.001500	.00001414	.009425	.009425	.009425	1.0000	1.000	.01885	.01885	1.000	1.000	.009424	7.284	55,560
.001600	.00001608	.01005	.01005	.01005	1.0001	.9999	.02011	.02011	1.000	1.000	.01005	7.052	48,830
.001700	.00001816	.01068	.01068	.01068	1.0001	.9999	.02136	.02136	1.000	1.000	.01068	6.842	43,260
.001800	.00002036	.01131	.01131	.01131	1.0001	.9999	.02262	.02262	1.000	1.000	.01131	6.649	38,580
.001900	.00002269	.01194	.01194	.01194	1.0001	.9999	.02388	.02388	1.000	1.000	.01194	6.472	34,630



d/L	d/L <sub>0</sub>	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	K	$4\pi d/L$	$\sinh 4\pi d/L$	$\cosh 4\pi d/L$	n	$c_d/c_0$	H/H <sub>10</sub>	M
.005000	.0001570	.03142	.03141	.03143	1.00005	.9995	.06283	.06287	1.002	.9997	.03139	3.991	5.003
.005100	.0001634	.03204	.03203	.03205	1.00005	.9995	.06409	.06413	1.002	.9997	.03202	3.951	4.809
.005200	.0001698	.03267	.03266	.03268	1.00005	.9995	.06535	.06539	1.002	.9996	.03265	3.913	4.626
.005300	.0001764	.03330	.03329	.03331	1.00005	.9995	.06660	.06665	1.002	.9996	.03328	3.876	4.453
.005400	.0001832	.03393	.03392	.03394	1.00006	.9994	.06786	.06791	1.002	.9996	.03391	3.840	4.290
.005500	.0001900	.03456	.03455	.03457	1.00006	.9994	.06911	.06916	1.002	.9996	.03454	3.805	4.135
.005600	.0001970	.03519	.03517	.03520	1.00006	.9994	.07037	.07042	1.002	.9996	.03517	3.771	3.989
.005700	.0002041	.03581	.03580	.03582	1.00006	.9994	.07163	.07169	1.003	.9996	.03579	3.738	3.851
.005800	.0002112	.03644	.03642	.03645	1.00007	.9993	.07288	.07294	1.003	.9996	.03641	3.706	3.719
.005900	.0002186	.03707	.03705	.03708	1.00007	.9993	.07414	.07420	1.003	.9995	.03703	3.675	3.594
.006000	.0002261	.03770	.03768	.03771	1.00007	.9993	.07540	.07547	1.003	.9995	.03766	3.644	3.475
.006100	.0002337	.03833	.03831	.03834	1.00007	.9993	.07665	.07672	1.003	.9995	.03829	3.614	3.363
.006200	.0002414	.03896	.03894	.03897	1.00008	.9992	.07791	.07798	1.003	.9995	.03892	3.584	3.255
.006300	.0002492	.03958	.03956	.03959	1.00008	.9992	.07917	.07925	1.003	.9995	.03954	3.556	3.153
.006400	.0002570	.04021	.04019	.04022	1.00008	.9992	.08042	.08050	1.003	.9995	.04017	3.528	3.055
.006500	.0002653	.04084	.04082	.04085	1.00008	.9992	.08168	.08177	1.003	.9994	.04080	3.501	2.962
.006600	.0002735	.04147	.04144	.04148	1.00009	.9991	.08294	.08303	1.003	.9994	.04142	3.475	2.873
.006700	.0002819	.04210	.04207	.04211	1.00009	.9991	.08419	.08428	1.004	.9994	.04204	3.449	2.788
.006800	.0002904	.04273	.04270	.04274	1.00009	.9991	.08545	.08555	1.004	.9994	.04267	3.423	2.707
.006900	.0002990	.04335	.04333	.04336	1.00009	.9991	.08671	.08681	1.004	.9994	.04330	3.398	2.629
.007000	.0003077	.04398	.04395	.04399	1.0010	.9990	.08796	.08807	1.004	.9994	.04392	3.374	2.554
.007100	.0003165	.04461	.04458	.04462	1.0010	.9990	.08922	.08933	1.004	.9993	.04455	3.350	2.483
.007200	.0003254	.04524	.04521	.04525	1.0010	.9989	.09048	.09060	1.004	.9993	.04518	3.327	2.415
.007300	.0003346	.04587	.04584	.04589	1.0011	.9989	.09173	.09185	1.004	.9993	.04581	3.304	2.349
.007400	.0003439	.04650	.04646	.04652	1.0011	.9989	.09299	.09312	1.004	.9993	.04644	3.281	2.286
.007500	.0003532	.04712	.04709	.04714	1.0011	.9989	.09425	.09438	1.004	.9993	.04706	3.260	2.226
.007600	.0003627	.04775	.04772	.04777	1.0011	.9989	.09550	.09565	1.005	.9992	.04768	3.238	2.167
.007700	.0003722	.04838	.04834	.04840	1.0012	.9988	.09676	.09681	1.005	.9992	.04830	3.217	2.112
.007800	.0003820	.04901	.04897	.04903	1.0012	.9988	.09802	.09817	1.005	.9992	.04893	3.197	2.058
.007900	.0003918	.04964	.04960	.04966	1.0012	.9988	.09927	.09943	1.005	.9992	.04956	3.176	2.006

d/L	d/L <sub>0</sub>	2π d/L	TANH 2π d/L	SINH 2π d/L	COSH 2π d/L	κ	4π d/L	SINH 4π d/L	COSH 4π d/L	n	C <sub>q</sub> /C <sub>0</sub>	H/H' <sub>0</sub>	M
.008000	.0004018	.05027	.05022	.05029	1.0013	.9987	.1005	.1007	1.005	.9992	.05018	3.157	1,956
.008100	.0004118	.05089	.05085	.05091	1.0013	.9987	.1018	.1020	1.005	.9991	.05080	3.137	1,909
.008200	.0004221	.05152	.05147	.05154	1.0013	.9987	.1030	.1032	1.005	.9991	.05142	3.118	1,862
.008300	.0004324	.05215	.05210	.05217	1.0014	.9986	.1043	.1045	1.005	.9991	.05205	3.099	1,818
.008400	.0004429	.05278	.05273	.05280	1.0014	.9986	.1056	.1058	1.006	.9991	.05268	3.081	1,775
.008500	.0004536	.05341	.05336	.05343	1.0014	.9986	.1068	.1070	1.006	.9991	.05331	3.062	1,733
.008600	.0004644	.05404	.05398	.05406	1.0015	.9985	.1081	.1083	1.006	.9990	.05394	3.044	1,693
.008700	.0004751	.05466	.05461	.05469	1.0015	.9985	.1093	.1095	1.006	.9990	.05456	3.027	1,655
.008800	.0004860	.05529	.05524	.05533	1.0015	.9985	.1106	.1108	1.006	.9990	.05518	3.010	1,617
.008900	.0004972	.05592	.05586	.05595	1.0016	.9984	.1118	.1121	1.006	.9990	.05580	2.993	1,581
.009000	.0005084	.05655	.05649	.05658	1.0016	.9984	.1131	.1133	1.006	.9989	.05643	2.977	1,546
.009100	.0005198	.05718	.05712	.05721	1.0016	.9984	.1144	.1146	1.006	.9989	.05706	2.960	1,513
.009200	.0005312	.05781	.05774	.05784	1.0017	.9983	.1156	.1158	1.007	.9989	.05768	2.944	1,480
.009300	.0005427	.05843	.05836	.05846	1.0017	.9983	.1169	.1171	1.007	.9989	.05830	2.929	1,449
.009400	.0005545	.05906	.05899	.05909	1.0017	.9983	.1181	.1184	1.007	.9988	.05892	2.913	1,418
.009500	.0005664	.05969	.05962	.05973	1.0018	.9982	.1194	.1196	1.007	.9988	.05955	2.898	1,388
.009600	.0005784	.06032	.06025	.06036	1.0018	.9982	.1206	.1209	1.007	.9988	.06018	2.882	1,360
.009700	.0005905	.06095	.06087	.06099	1.0019	.9981	.1219	.1222	1.007	.9988	.06080	2.867	1,332
.009800	.0006027	.06158	.06150	.06162	1.0019	.9981	.1232	.1235	1.008	.9987	.06142	2.853	1,305
.009900	.0006150	.06220	.06212	.06224	1.0019	.9981	.1244	.1247	1.008	.9987	.06204	2.839	1,279
.01000	.0006275	.06283	.06275	.06287	1.0020	.9980	.1257	.1260	1.0079	.9987	.06267	2.825	1,253
.01100	.0007591	.06912	.06901	.06917	1.0024	.9976	.1382	.1387	1.0096	.9984	.06890	2.694	1,036
.01200	.0009031	.07540	.07528	.07547	1.0028	.9972	.1508	.1513	1.0114	.9981	.07511	2.580	871.0
.01300	.001060	.08168	.08150	.08177	1.0033	.9967	.1634	.1641	1.0134	.9978	.08131	2.480	742.9
.01400	.001228	.08795	.08774	.08808	1.0039	.9961	.1759	.1768	1.0155	.9974	.08751	2.389	644.1
.01500	.001410	.09425	.09397	.09439	1.0044	.9956	.1885	.1896	1.0178	.9970	.09369	2.310	558.9
.01600	.001603	.1005	.1002	.1007	1.0051	.9943	.2011	.2024	1.0203	.9966	.09986	2.238	491.6
.01700	.001809	.1068	.1064	.1070	1.0057	.9943	.2136	.2153	1.0229	.9962	.1060	2.172	435.8
.01800	.002027	.1131	.1126	.1133	1.0064	.9936	.2262	.2281	1.0257	.9958	.1121	2.112	389.1
.01900	.002258	.1194	.1188	.1197	1.0071	.9929	.2388	.2410	1.0286	.9953	.1183	2.056	349.5

$d/L$	$d/Lo$	$2\pi d/L$	$TANH$ $2\pi d/L$	$SINH$ $2\pi d/L$	$COSH$ $2\pi d/L$	$K$	$Li\pi d/L$	$SINH$ $Li\pi d/L$	$COSH$ $Li\pi d/L$	$n$	$C_G/C_o$	$H/H_o$	$M$
.02000	.002500	.1257	.1250	.1260	1.008	.9922	.2513	.2540	1.032	.9947	.1244	2.005	315.8
.02100	.002755	.1320	.1312	.1323	1.009	.9914	.2639	.2669	1.035	.9942	.1305	1.958	286.8
.02200	.003022	.1382	.1374	.1387	1.010	.9905	.2765	.2800	1.038	.9937	.1365	1.915	261.5
.02300	.003301	.1445	.1435	.1450	1.011	.9896	.2890	.2931	1.042	.9931	.1425	1.873	239.6
.02400	.003592	.1508	.1497	.1514	1.011	.9887	.3016	.3062	1.046	.9925	.1485	1.834	220.3
.02500	.003895	.1571	.1558	.1577	1.012	.9878	.3142	.3194	1.050	.9919	.1545	1.799	203.3
.02600	.004210	.1634	.1619	.1641	1.013	.9868	.3267	.3326	1.054	.9912	.1605	1.765	188.2
.02700	.004537	.1697	.1680	.1705	1.014	.9858	.3393	.3458	1.058	.9905	.1665	1.733	174.8
.02800	.004876	.1759	.1741	.1768	1.016	.9847	.3519	.3592	1.063	.9898	.1724	1.703	162.7
.02900	.005226	.1822	.1802	.1832	1.017	.9836	.3644	.3725	1.067	.9891	.1783	1.675	151.9
.03000	.005589	.1885	.1863	.1896	1.018	.9825	.3770	.3860	1.072	.9884	.1841	1.648	142.2
.03100	.005963	.1948	.1924	.1960	1.019	.9813	.3896	.3995	1.077	.9876	.1900	1.622	133.4
.03200	.006347	.2011	.1984	.2024	1.020	.9801	.4021	.4131	1.082	.9868	.1958	1.598	125.4
.03300	.006746	.2073	.2044	.2088	1.022	.9789	.4147	.4267	1.087	.9860	.2016	1.575	118.1
.03400	.007155	.2136	.2104	.2153	1.023	.9776	.4273	.4404	1.093	.9851	.2073	1.553	111.4
.03500	.007575	.2199	.2164	.2217	1.024	.9763	.4398	.4541	1.098	.9843	.2130	1.532	105.3
.03600	.008007	.2262	.2224	.2281	1.026	.9749	.4524	.4680	1.104	.9834	.2187	1.512	99.75
.03700	.008450	.2325	.2284	.2346	1.027	.9736	.4650	.4819	1.110	.9824	.2244	1.493	94.61
.03800	.008905	.2388	.2343	.2410	1.029	.9722	.4775	.4959	1.116	.9815	.2300	1.475	89.88
.03900	.009370	.2450	.2403	.2527	1.030	.9708	.4901	.5099	1.123	.9805	.2356	1.457	85.50
.04000	.009847	.2513	.2462	.2540	1.032	.9693	.5027	.5241	1.129	.9795	.2411	1.440	81.43
.04100	.01033	.2576	.2521	.2605	1.033	.9677	.5152	.5383	1.136	.9785	.2467	1.424	77.67
.04200	.01083	.2639	.2579	.2670	1.035	.9662	.5278	.5526	1.143	.9775	.2521	1.408	74.17
.04300	.01134	.2702	.2638	.2735	1.037	.9646	.5404	.5670	1.150	.9765	.2576	1.393	70.91
.04400	.01186	.2765	.2696	.2800	1.039	.9630	.5529	.5815	1.157	.9754	.2630	1.379	67.88
.04500	.01239	.2827	.2754	.2865	1.040	.9613	.5655	.5961	1.164	.9743	.2684	1.365	65.05
.04600	.01294	.2890	.2812	.2931	1.042	.9596	.5781	.6108	1.172	.9732	.2737	1.352	62.39
.04700	.01349	.2953	.2870	.2996	1.044	.9579	.5906	.6256	1.180	.9721	.2790	1.339	59.91
.04800	.01405	.3016	.2928	.3062	1.046	.9562	.6032	.6404	1.188	.9709	.2843	1.326	57.57
.04900	.01463	.3079	.2985	.3128	1.048	.9544	.6158	.6554	1.196	.9697	.2895	1.314	55.38

d/L	d/Lo	2 $\pi$ d/L	TANH 2 $\pi$ d/L	SINH 2 $\pi$ d/L	COSH 2 $\pi$ d/L	K	$4 \pi$ d/L	SINH $4 \pi$ d/L	COSH $4 \pi$ d/L	n	C <sub>g</sub> /C <sub>o</sub>	H/H <sub>0</sub>	M
.05000	.01521	.3142	.3042	.3194	1.050	.9526	.6283	.6705	1.204	.9685	.2947	1.303	53.32
.05100	.01580	.3204	.3099	.3260	1.052	.9508	.6409	.6857	1.213	.9673	.2998	1.291	51.38
.05200	.01641	.3267	.3156	.3326	1.054	.9489	.6535	.7010	1.221	.9661	.3049	1.281	49.55
.05300	.01702	.3330	.3212	.3392	1.056	.9470	.6660	.7164	1.230	.9649	.3099	1.270	47.82
.05400	.01765	.3393	.3269	.3458	1.058	.9451	.6786	.7319	1.239	.9636	.3149	1.260	46.19
.05500	.01829	.3456	.3325	.3525	1.060	.9431	.6912	.7475	1.249	.9623	.3199	1.250	44.65
.05600	.01893	.3519	.3380	.3592	1.063	.9411	.7037	.7633	1.258	.9610	.3248	1.241	43.19
.05700	.01958	.3581	.3436	.3658	1.065	.9391	.7163	.7791	1.268	.9597	.3297	1.231	41.80
.05800	.02025	.3644	.3491	.3726	1.067	.9371	.7289	.7951	1.278	.9583	.3346	1.222	40.49
.05900	.02092	.3707	.3546	.3793	1.070	.9350	.7414	.8112	1.288	.9570	.3394	1.214	39.24
.06000	.02161	.3770	.3601	.3860	1.072	.9329	.7540	.8275	1.298	.9556	.3441	1.205	38.06
.06100	.02230	.3833	.3656	.3927	1.074	.9308	.7666	.8439	1.308	.9542	.3488	1.197	36.93
.06200	.02300	.3896	.3710	.3995	1.077	.9286	.7791	.8604	1.319	.9528	.3534	1.189	35.86
.06300	.02371	.3958	.3764	.4062	1.079	.9265	.7917	.8770	1.330	.9514	.3581	1.182	34.83
.06400	.02444	.4021	.3818	.4130	1.082	.9243	.8043	.8938	1.341	.9499	.3626	1.174	33.86
.06500	.02516	.4084	.3871	.4199	1.085	.9220	.8168	.9107	1.353	.9484	.3672	1.167	32.93
.06600	.02590	.4147	.3925	.4267	1.087	.9198	.8294	.9278	1.364	.9470	.3716	1.160	32.04
.06700	.02665	.4210	.3978	.4335	1.090	.9175	.8419	.9450	1.376	.9455	.3761	1.153	31.19
.06800	.02739	.4273	.4030	.4404	1.093	.9152	.8545	.9624	1.388	.9440	.3804	1.147	30.38
.06900	.02817	.4335	.4083	.4473	1.095	.9128	.8671	.9799	1.400	.9424	.3848	1.140	29.61
.07000	.02895	.4398	.4135	.4541	1.098	.9105	.8796	.9976	1.412	.9409	.3891	1.134	28.86
.07100	.02973	.4461	.4187	.4611	1.101	.9081	.8922	1.015	1.425	.9393	.3933	1.128	28.15
.07200	.03052	.4524	.4239	.4680	1.104	.9057	.9048	1.033	1.438	.9378	.3975	1.122	27.47
.07300	.03132	.4587	.4290	.4749	1.107	.9033	.9173	1.052	1.451	.9362	.4016	1.116	26.81
.07400	.03213	.4650	.4341	.4819	1.110	.9008	.9299	1.070	1.464	.9346	.4057	1.110	26.18
.07500	.03294	.4712	.4392	.4889	1.113	.8984	.9425	1.088	1.478	.9330	.4098	1.105	25.58
.07600	.03377	.4775	.4443	.4958	1.116	.8959	.9551	1.107	1.492	.9314	.4138	1.099	25.00
.07700	.03460	.4838	.4493	.5029	1.119	.8934	.9676	1.126	1.506	.9298	.4177	1.094	24.45
.07800	.03543	.4901	.4542	.5100	1.123	.8909	.9802	1.145	1.520	.9281	.4216	1.089	23.92
.07900	.03628	.4964	.4593	.5170	1.126	.8883	.9927	1.164	1.534	.9264	.4255	1.084	23.40



d/L	d/L <sub>0</sub>	2π d/L	TANH 2π d/L	SINH 2π d/L	COSH 2π d/L	K	l <sub>1</sub> π d/L	SINH l <sub>1</sub> π d/L	COSH l <sub>1</sub> π d/L	n	c <sub>d</sub> /c <sub>0</sub>	H/H <sub>1</sub> °	M
.1100	.06586	.6912	.5987	.7475	1.249	.8010	1.382	1.867	2.118	.8703	.5211	.9197	13.77
.1110	.06690	.6974	.6027	.7554	1.253	.7980	1.395	1.893	2.141	.8684	.5234	.9775	13.58
.1120	.06795	.7037	.6067	.7633	1.258	.7949	1.407	1.920	2.165	.8665	.5257	.9753	13.41
.1130	.06901	.7100	.6107	.7712	1.263	.7919	1.420	1.948	2.189	.8645	.5279	.9731	13.23
.1140	.07006	.7163	.6146	.7791	1.268	.7888	1.433	1.975	2.214	.8626	.5301	.9711	13.06
.1150	.07113	.7226	.6185	.7871	1.273	.7858	1.445	2.003	2.239	.8607	.5323	.9691	12.90
.1160	.07220	.7289	.6224	.7951	1.278	.7827	1.458	2.032	2.264	.8587	.5344	.9672	12.74
.1170	.07327	.7351	.6262	.8032	1.283	.7797	1.470	2.060	2.290	.8568	.5365	.9654	12.59
.1180	.07434	.7414	.6300	.8112	1.288	.7766	1.483	2.089	2.316	.8549	.5386	.9635	12.43
.1190	.07542	.7477	.6338	.8193	1.293	.7735	1.495	2.118	2.343	.8529	.5406	.9617	12.29
.1200	.07650	.7540	.6375	.8275	1.298	.7704	1.508	2.148	2.369	.8510	.5425	.9600	12.14
.1210	.07759	.7603	.6412	.8357	1.303	.7673	1.521	2.178	2.397	.8491	.5444	.9583	12.00
.1220	.07868	.7666	.6449	.8439	1.309	.7642	1.533	2.208	2.424	.8471	.5463	.9567	11.87
.1230	.07978	.7728	.6486	.8521	1.314	.7612	1.546	2.239	2.452	.8452	.5482	.9551	11.73
.1240	.08085	.7791	.6520	.8604	1.319	.7581	1.558	2.270	2.480	.8432	.5500	.9535	11.61
.1250	.08198	.7854	.6558	.8687	1.325	.7549	1.571	2.301	2.509	.8413	.5517	.9520	11.48
.1260	.08308	.7917	.6594	.8770	1.330	.7518	1.583	2.333	2.538	.8393	.5534	.9505	11.35
.1270	.08419	.7980	.6629	.8854	1.336	.7487	1.596	2.365	2.568	.8374	.5551	.9490	11.23
.1280	.08530	.8043	.6664	.8938	1.341	.7456	1.609	2.398	2.598	.8354	.5568	.9476	11.11
.1290	.08642	.8105	.6699	.9022	1.347	.7424	1.621	2.430	2.628	.8335	.5584	.9463	11.00
.1300	.08753	.8168	.6733	.9107	1.353	.7393	1.634	2.464	2.659	.8316	.5599	.9450	10.89
.1310	.08866	.8231	.6768	.9192	1.358	.7362	1.646	2.497	2.690	.8296	.5614	.9437	10.78
.1320	.08978	.8294	.6801	.9278	1.364	.7331	1.659	2.531	2.722	.8277	.5629	.9424	10.67
.1330	.09091	.8357	.6835	.9364	1.370	.7299	1.671	2.566	2.754	.8257	.5644	.9412	10.56
.1340	.09204	.8420	.6868	.9450	1.376	.7268	1.684	2.600	2.786	.8238	.5658	.9401	10.46
.1350	.09317	.8482	.6902	.9537	1.382	.7237	1.696	2.636	2.819	.8218	.5672	.9389	10.36
.1360	.09431	.8545	.6934	.9624	1.388	.7205	1.709	2.671	2.852	.8199	.5685	.9378	10.26
.1370	.09544	.8608	.6967	.9711	1.394	.7174	1.722	2.707	2.886	.8179	.5698	.9367	10.17
.1380	.09659	.8671	.6999	.9799	1.400	.7142	1.734	2.744	2.920	.8160	.5711	.9357	10.07
.1390	.09773	.8734	.7031	.9887	1.406	.7111	1.747	2.781	2.955	.8141	.5724	.9347	9.983

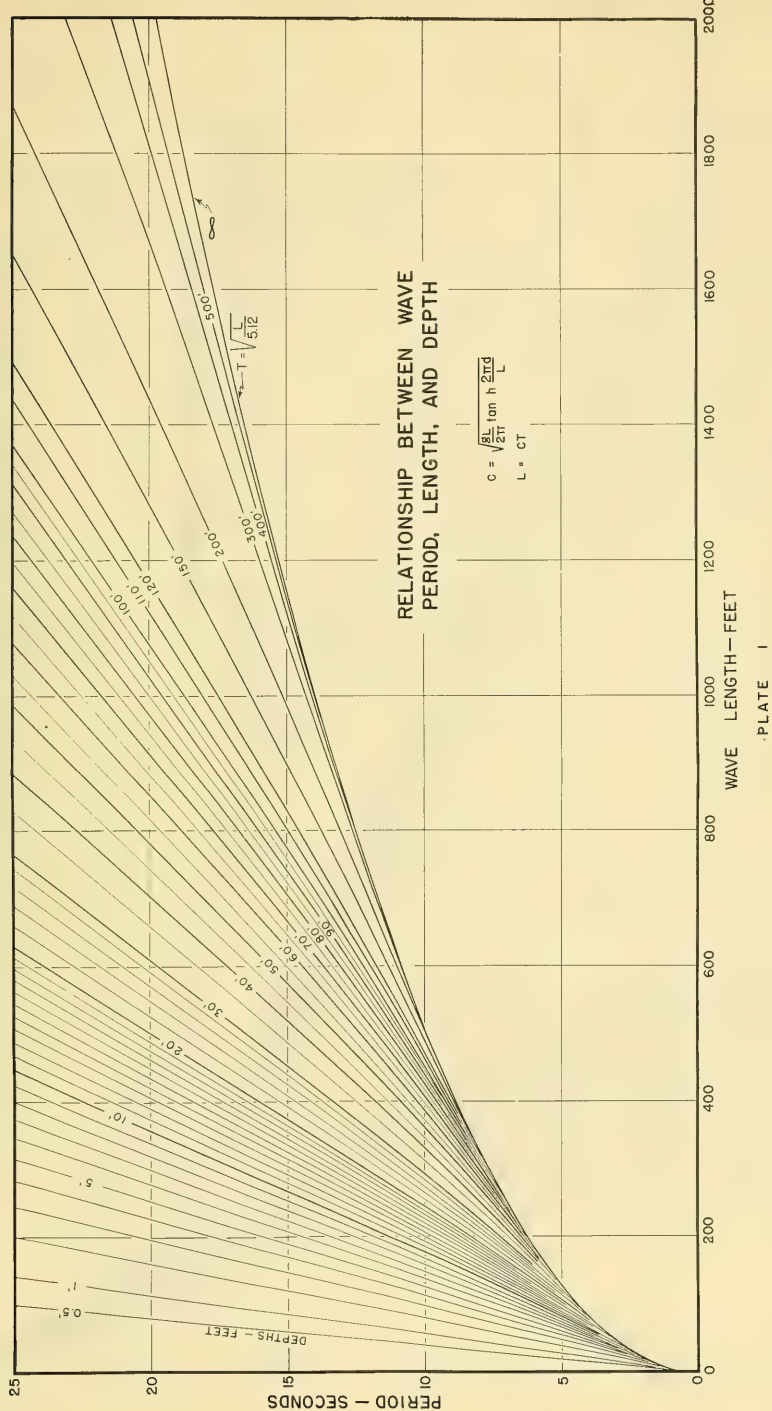
d/L	d/L <sub>0</sub>	2 $\pi$ d/L	TANH 2 $\pi$ d/L	SINH 2 $\pi$ d/L	COSH 2 $\pi$ d/L	K	$\frac{1}{4} \pi$ d/L	SINH $\frac{1}{4} \pi$ d/L	COSH $\frac{1}{4} \pi$ d/L	n	C <sub>d</sub> /C <sub>0</sub>	H/H <sub>1</sub> ' <sub>0</sub>	M
.1100	.09888	.8797	.7063	.9976	1.112	.7080	1.759	2.818	2.990	.8121	.5736	.9337	9.894
.1110	.1000	.8859	.7091	1.006	1.119	.7048	1.772	2.856	3.026	.8102	.5718	.9327	9.806
.1120	.1012	.8922	.7125	1.015	1.125	.7017	1.784	2.894	3.062	.8083	.5759	.9318	9.721
.1130	.1023	.8985	.7156	1.024	1.132	.6985	1.797	2.933	3.099	.8064	.5770	.9309	9.638
.1140	.1035	.9048	.7186	1.033	1.138	.6954	1.810	2.972	3.136	.8044	.5781	.9300	9.556
.1150	.1046	.9111	.7216	1.042	1.145	.6923	1.822	3.012	3.173	.8025	.5791	.9292	9.476
.1160	.1058	.9174	.7247	1.052	1.151	.6891	1.835	3.052	3.211	.8006	.5801	.9284	9.398
.1170	.1070	.9236	.7276	1.061	1.158	.6860	1.847	3.092	3.250	.7987	.5811	.9276	9.321
.1180	.1081	.9299	.7306	1.070	1.164	.6829	1.860	3.133	3.289	.7968	.5821	.9268	9.246
.1190	.1093	.9362	.7335	1.079	1.171	.6797	1.872	3.175	3.329	.7949	.5830	.9261	9.173
.1200	.1105	.9425	.7364	1.088	1.178	.6766	1.885	3.217	3.369	.7930	.5839	.9254	9.101
.1210	.1116	.9488	.7392	1.098	1.185	.6734	1.898	3.260	3.410	.7911	.5848	.9247	9.031
.1220	.1128	.9551	.7421	1.107	1.192	.6703	1.910	3.303	3.451	.7892	.5856	.9240	8.962
.1230	.1140	.9613	.7449	1.116	1.199	.6672	1.923	3.346	3.493	.7873	.5864	.9234	8.894
.1240	.1151	.9676	.7477	1.126	1.206	.6641	1.935	3.391	3.535	.7854	.5872	.9228	8.828
.1250	.1163	.9739	.7504	1.135	1.213	.6610	1.948	3.435	3.578	.7835	.5880	.9222	8.763
.1260	.1175	.9802	.7531	1.145	1.220	.6579	1.960	3.481	3.621	.7816	.5887	.9216	8.700
.1270	.1187	.9865	.7558	1.154	1.227	.6547	1.973	3.526	3.665	.7797	.5893	.9211	8.638
.1280	.1199	.9928	.7585	1.164	1.235	.6516	1.985	3.573	3.710	.7779	.5900	.9205	8.577
.1290	.1210	.9990	.7612	1.174	1.242	.6485	1.998	3.620	3.755	.7760	.5907	.9200	8.517
.1300	.1222	1.005	.7638	1.183	1.249	.6454	2.011	3.667	3.801	.7741	.5913	.9196	8.459
.1310	.1234	1.012	.7664	1.193	1.257	.6423	2.023	3.715	3.847	.7723	.5919	.9191	8.401
.1320	.1246	1.018	.7690	1.203	1.264	.6392	2.036	3.764	3.894	.7704	.5925	.9186	8.345
.1330	.1258	1.024	.7716	1.213	1.272	.6361	2.048	3.813	3.942	.7686	.5930	.9182	8.290
.1340	.1270	1.030	.7741	1.223	1.280	.6331	2.061	3.863	3.990	.7667	.5935	.9179	8.236
.1350	.1281	1.037	.7766	1.233	1.287	.6300	2.073	3.913	4.039	.7649	.5940	.9175	8.183
.1360	.1293	1.043	.7791	1.243	1.295	.6269	2.086	3.964	4.088	.7631	.5945	.9171	8.131
.1370	.1305	1.049	.7815	1.253	1.303	.6239	2.099	4.016	4.138	.7613	.5950	.9167	8.079
.1380	.1317	1.056	.7840	1.263	1.311	.6208	2.111	4.068	4.189	.7595	.5954	.9164	8.029
.1390	.1329	1.062	.7864	1.273	1.319	.6177	2.124	4.121	4.241	.7576	.5958	.9161	7.980

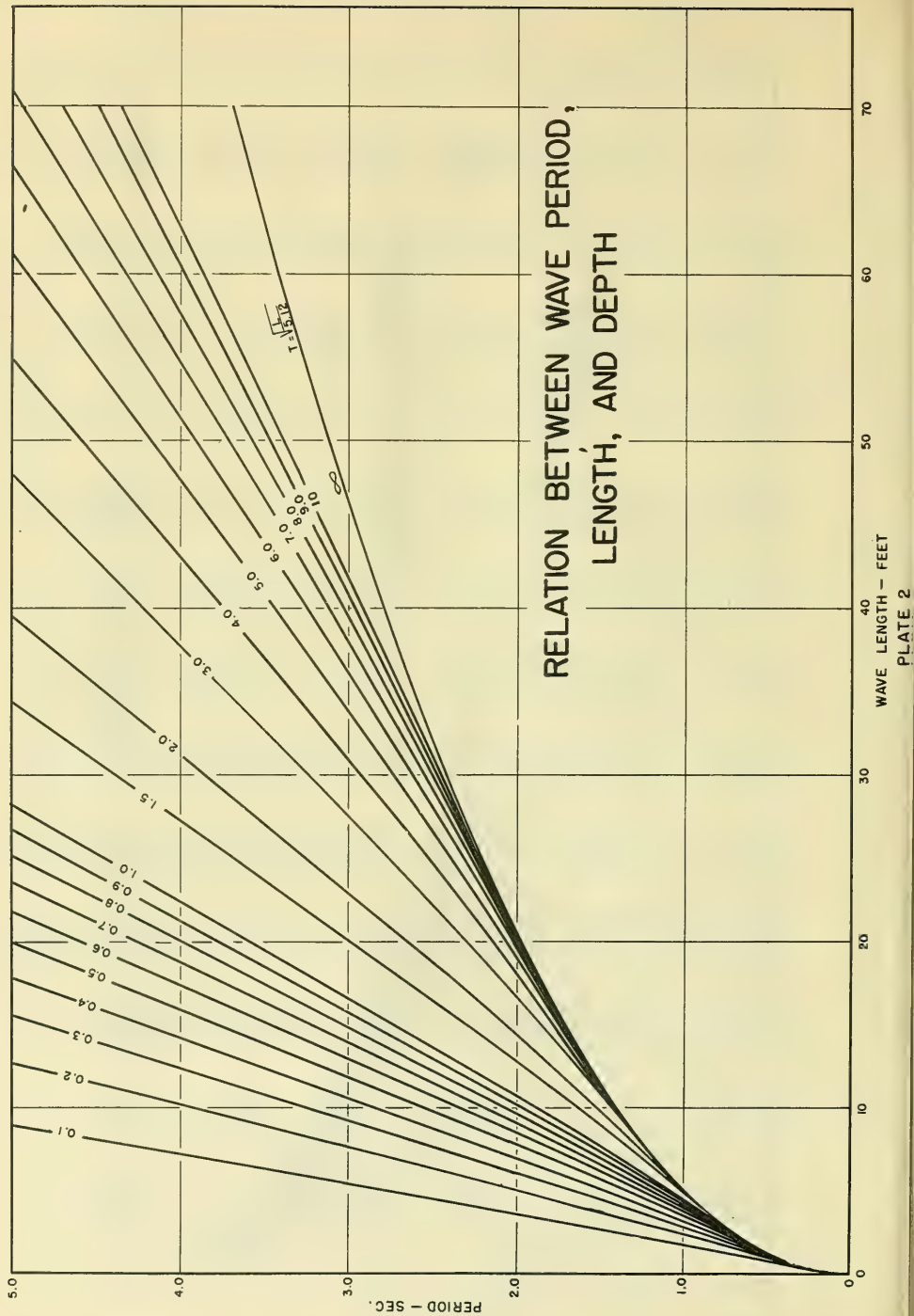
d/L	d/L <sub>0</sub>	2π d/L	TANH 2π d/L	SINH 2π d/L	COSH 2π d/L	K	4π d/L	SINH 4π d/L	COSH 4π d/L	n	C <sub>d</sub> /C <sub>0</sub>	H/H <sub>0</sub>	M
.1700	.1311	1.068	.7887	1.283	1.627	.6117	2.136	4.175	4.293	.7558	.5962	.9158	7.932
.1710	.1353	1.074	.7911	1.293	1.635	.6117	2.149	4.229	4.306	.7540	.5965	.9155	7.885
.1720	.1365	1.081	.7935	1.304	1.643	.6086	2.161	4.284	4.399	.7523	.5969	.9153	7.838
.1730	.1377	1.087	.7958	1.314	1.651	.6056	2.174	4.340	4.454	.7505	.5972	.9150	7.793
.1740	.1389	1.093	.7981	1.325	1.660	.6026	2.187	4.396	4.508	.7487	.5975	.9148	7.748
.1750	.1401	1.100	.8004	1.335	1.668	.5995	2.199	4.453	4.564	.7469	.5978	.9146	7.704
.1760	.1413	1.106	.8026	1.345	1.676	.5965	2.212	4.511	4.620	.7451	.5980	.9144	7.661
.1770	.1425	1.112	.8048	1.356	1.685	.5935	2.224	4.569	4.677	.7434	.5983	.9142	7.619
.1780	.1437	1.118	.8070	1.367	1.693	.5905	2.237	4.628	4.735	.7416	.5985	.9140	7.577
.1790	.1449	1.125	.8092	1.377	1.702	.5875	2.249	4.688	4.793	.7399	.5987	.9138	7.536
.1800	.1460	1.131	.8114	1.388	1.711	.5845	2.262	4.749	4.853	.7382	.5989	.9137	7.496
.1810	.1472	1.137	.8135	1.399	1.720	.5816	2.275	4.810	4.918	.7364	.5991	.9136	7.457
.1820	.1484	1.144	.8156	1.410	1.728	.5786	2.287	4.872	4.974	.7347	.5992	.9135	7.419
.1830	.1496	1.150	.8177	1.420	1.737	.5757	2.300	4.935	5.035	.7330	.5993	.9134	7.381
.1840	.1508	1.156	.8198	1.431	1.746	.5727	2.312	4.999	5.098	.7313	.5995	.9133	7.343
.1850	.1520	1.162	.8218	1.442	1.755	.5697	2.325	5.063	5.161	.7296	.5996	.9132	7.307
.1860	.1532	1.169	.8239	1.454	1.764	.5668	2.337	5.129	5.225	.7279	.5997	.9131	7.271
.1870	.1544	1.175	.8259	1.465	1.773	.5639	2.350	5.195	5.290	.7262	.5997	.9131	7.235
.1880	.1556	1.181	.8278	1.476	1.783	.5610	2.362	5.262	5.356	.7245	.5998	.9131	7.201
.1890	.1568	1.188	.8298	1.487	1.792	.5581	2.375	5.329	5.422	.7228	.5998	.9130	7.167
.1900	.1580	1.194	.8318	1.498	1.801	.5551	2.388	5.398	5.490	.7212	.5998	.9130	7.133
.1910	.1592	1.200	.8337	1.510	1.811	.5522	2.400	5.467	5.558	.7195	.5998	.9130	7.100
.1920	.1604	1.206	.8356	1.521	1.820	.5493	2.413	5.538	5.625	.7179	.5998	.9130	7.068
.1930	.1616	1.213	.8375	1.533	1.830	.5465	2.425	5.609	5.697	.7162	.5998	.9130	7.036
.1940	.1628	1.219	.8393	1.544	1.840	.5436	2.438	5.681	5.768	.7146	.5998	.9131	7.005
.1950	.1640	1.225	.8412	1.556	1.849	.5408	2.450	5.754	5.840	.7129	.5997	.9131	6.974
.1960	.1652	1.232	.8430	1.567	1.859	.5379	2.463	5.827	5.913	.7113	.5997	.9131	6.944
.1970	.1664	1.238	.8448	1.579	1.869	.5350	2.476	5.902	5.988	.7097	.5996	.9132	6.914
.1980	.1676	1.244	.8466	1.591	1.879	.5322	2.488	5.978	6.061	.7081	.5995	.9133	6.885
.1990	.1688	1.250	.8484	1.603	1.889	.5294	2.501	6.055	6.137	.7065	.5994	.9133	6.856

d/L	d/L <sub>0</sub>	$2\pi d/L$	$\tanh 2\pi d/L$	$\sinh 2\pi d/L$	$\cosh 2\pi d/L$	K	$L\pi d/L$	$\sinh L\pi d/L$	$\cosh L\pi d/L$	n	$C_c/C_0$	H/H <sub>0</sub>	M
.2000	.1700	1.257	.8501	1.614	1.899	.5266	2.513	6.132	6.213	.7049	.5993	.9134	6.828
.2010	.1712	1.263	.8519	1.626	1.909	.5238	2.526	6.211	6.291	.7033	.5992	.9135	6.801
.2020	.1724	1.269	.8535	1.638	1.920	.5210	2.538	6.290	6.369	.7018	.5990	.9137	6.774
.2030	.1736	1.276	.8552	1.651	1.930	.5182	2.551	6.371	6.449	.7002	.5988	.9138	6.747
.2040	.1748	1.282	.8570	1.663	1.940	.5154	2.564	6.452	6.529	.6987	.5987	.9139	6.720
.2050	.1760	1.288	.8586	1.675	1.951	.5127	2.576	6.535	6.611	.6971	.5986	.9140	6.694
.2060	.1772	1.294	.8602	1.687	1.961	.5099	2.589	6.619	6.694	.6956	.5984	.9141	6.669
.2070	.1784	1.301	.8619	1.700	1.972	.5071	2.601	6.703	6.777	.6941	.5982	.9142	6.644
.2080	.1796	1.307	.8635	1.712	1.983	.5044	2.614	6.789	6.862	.6925	.5980	.9144	6.619
.2090	.1808	1.313	.8651	1.725	1.994	.5016	2.626	6.876	6.948	.6910	.5978	.9146	6.594
.2100	.1820	1.320	.8667	1.737	2.004	.4989	2.639	6.963	7.035	.6895	.5976	.9147	6.570
.2110	.1832	1.326	.8682	1.750	2.015	.4962	2.652	7.052	7.123	.6880	.5973	.9149	6.547
.2120	.1844	1.332	.8697	1.762	2.026	.4935	2.664	7.143	7.219	.6865	.5971	.9151	6.524
.2130	.1856	1.338	.8713	1.775	2.037	.4908	2.677	7.234	7.302	.6850	.5969	.9153	6.501
.2140	.1868	1.345	.8728	1.788	2.049	.4881	2.689	7.326	7.394	.6835	.5966	.9155	6.479
.2150	.1880	1.351	.8743	1.801	2.060	.4854	2.702	7.420	7.487	.6821	.5963	.9157	6.457
.2160	.1892	1.357	.8757	1.814	2.071	.4828	2.714	7.514	7.580	.6806	.5960	.9159	6.435
.2170	.1904	1.364	.8772	1.827	2.083	.4801	2.727	7.610	7.675	.6792	.5958	.9161	6.413
.2180	.1915	1.370	.8786	1.840	2.094	.4775	2.739	7.707	7.772	.6777	.5955	.9164	6.393
.2190	.1927	1.376	.8801	1.853	2.106	.4749	2.752	7.805	7.869	.6763	.5952	.9166	6.372
.2200	.1939	1.382	.8815	1.867	2.118	.4722	2.765	7.905	7.968	.6749	.5949	.9168	6.351
.2210	.1951	1.389	.8829	1.880	2.129	.4696	2.777	8.006	8.068	.6735	.5946	.9170	6.331
.2220	.1963	1.395	.8842	1.893	2.141	.4670	2.790	8.108	8.169	.6720	.5943	.9173	6.312
.2230	.1975	1.401	.8856	1.907	2.153	.4644	2.802	8.211	8.272	.6706	.5939	.9175	6.292
.2240	.1987	1.407	.8869	1.920	2.165	.4619	2.815	8.316	8.375	.6692	.5936	.9178	6.273
.2250	.1999	1.414	.8883	1.934	2.177	.4593	2.827	8.422	8.481	.6679	.5933	.9181	6.254
.2260	.2011	1.420	.8896	1.948	2.189	.4567	2.840	8.529	8.587	.6665	.5929	.9183	6.236
.2270	.2022	1.426	.8909	1.962	2.202	.4542	2.853	8.637	8.695	.6651	.5925	.9186	6.218
.2280	.2034	1.433	.8922	1.975	2.214	.4516	2.865	8.756	8.800	.6637	.5921	.9189	6.200
.2290	.2046	1.439	.8935	1.989	2.227	.4491	2.878	8.859	8.915	.6624	.5918	.9191	6.182

d/L	d/L <sub>0</sub>	2 $\pi$ d/L	TANH 2 $\pi$ d/L	SINH 2 $\pi$ d/L	COSH 2 $\pi$ d/L	K	4 $\pi$ d/L	SINH 4 $\pi$ d/L	COSH 4 $\pi$ d/L	n	c <sub>D</sub> /c <sub>0</sub>	H/H <sub>0</sub>	M
.2300	.2058	1.445	.8947	2.003	2.239	.4466	2.890	8.971	9.027	.6611	.5915	.9194	6.165
.2310	.2070	1.451	.8960	2.017	2.252	.4441	2.903	9.085	9.140	.6597	.5911	.9197	6.148
.2320	.2082	1.458	.8972	2.032	2.264	.4416	2.915	9.201	9.255	.6584	.5907	.9200	6.131
.2330	.2093	1.464	.8984	2.046	2.277	.4391	2.928	9.318	9.372	.6571	.5904	.9203	6.114
.2340	.2105	1.470	.8996	2.060	2.290	.4366	2.941	9.437	9.489	.6558	.5900	.9206	6.097
.2350	.2117	1.477	.9008	2.075	2.303	.4342	2.953	9.557	9.609	.6545	.5896	.9209	6.081
.2360	.2129	1.483	.9020	2.089	2.316	.4318	2.966	9.678	9.730	.6532	.5892	.9212	6.066
.2370	.2141	1.489	.9032	2.104	2.329	.4293	2.978	9.801	9.852	.6519	.5888	.9215	6.050
.2380	.2152	1.495	.9043	2.118	2.343	.4269	2.991	9.926	9.976	.6507	.5884	.9218	6.034
.2390	.2164	1.502	.9055	2.133	2.356	.4244	3.003	10.05	10.10	.6494	.5880	.9221	6.019
.2400	.2176	1.508	.9066	2.148	2.370	.4220	3.016	10.18	10.23	.6481	.5876	.9225	6.004
.2410	.2188	1.514	.9077	2.163	2.383	.4196	3.029	10.31	10.36	.6469	.5872	.9228	5.990
.2420	.2199	1.521	.9088	2.178	2.397	.4172	3.041	10.44	10.49	.6456	.5868	.9231	5.976
.2430	.2211	1.527	.9099	2.193	2.410	.4149	3.054	10.57	10.62	.6444	.5863	.9234	5.961
.2440	.2223	1.533	.9110	2.208	2.424	.4125	3.066	10.71	10.75	.6432	.5859	.9238	5.947
.2450	.2234	1.539	.9120	2.224	2.438	.4101	3.079	10.84	10.89	.6420	.5855	.9241	5.933
.2460	.2246	1.546	.9131	2.239	2.452	.4078	3.091	10.98	11.03	.6408	.5851	.9244	5.919
.2470	.2258	1.552	.9141	2.255	2.466	.4055	3.104	11.12	11.17	.6396	.5846	.9248	5.906
.2480	.2270	1.558	.9151	2.270	2.480	.4032	3.116	11.26	11.31	.6384	.5842	.9251	5.893
.2490	.2281	1.565	.9162	2.286	2.495	.4008	3.129	11.40	11.45	.6372	.5838	.9255	5.880
.2500	.2293	1.571	.9172	2.301	2.509	.3985	3.142	11.55	11.59	.6360	.5833	.9258	5.867
.2510	.2305	1.577	.9182	2.317	2.524	.3962	3.154	11.70	11.74	.6348	.5829	.9262	5.854
.2520	.2316	1.583	.9191	2.333	2.538	.3940	3.167	11.84	11.89	.6337	.5824	.9265	5.841
.2530	.2328	1.590	.9201	2.349	2.553	.3917	3.179	11.99	12.04	.6325	.5820	.9269	5.829
.2540	.2339	1.596	.9210	2.365	2.568	.3894	3.192	12.15	12.19	.6314	.5815	.9273	5.817
.2550	.2351	1.602	.9220	2.381	2.583	.3872	3.204	12.30	12.34	.6303	.5811	.9276	5.805
.2560	.2363	1.609	.9229	2.398	2.598	.3849	3.217	12.46	12.50	.6291	.5807	.9280	5.793
.2570	.2374	1.615	.9239	2.414	2.613	.3827	3.230	12.61	12.65	.6280	.5802	.9283	5.782
.2580	.2386	1.621	.9248	2.430	2.628	.3805	3.242	12.77	12.81	.6269	.5797	.9287	5.770
.2590	.2398	1.627	.9257	2.447	2.643	.3783	3.255	12.94	12.98	.6258	.5793	.9291	5.759

d/L	d/L <sub>0</sub>	$2\pi d/L$	TANH $2\pi d/L$	SINH $2\pi d/L$	COSH $2\pi d/L$	K	$4\pi d/L$	SINH $4\pi d/L$	COSH $4\pi d/L$	n	C <sub>g</sub> /C <sub>0</sub>	H/H <sub>0</sub>	M
.2600	.2409	1.634	.9266	2.4464	2.659	.3761	3.267	13.10	13.14	.6247	.5788	.9294	5.748
.2610	.2421	1.646	.9275	2.4480	2.674	.3739	3.280	13.27	13.31	.6236	.5784	.9298	5.737
.2620	.2432	1.660	.9283	2.4497	2.690	.3717	3.292	13.44	13.47	.6225	.5779	.9301	5.726
.2630	.2444	1.653	.9292	2.5114	2.706	.3696	3.305	13.61	13.64	.6215	.5775	.9305	5.716
.2640	.2455	1.659	.9301	2.531	2.722	.3674	3.318	13.78	13.81	.6204	.5770	.9309	5.705
.2650	.2467	1.665	.9309	2.548	2.737	.3653	3.330	13.95	13.99	.6193	.5765	.9313	5.695
.2660	.2478	1.671	.9317	2.566	2.754	.3632	3.343	14.13	14.17	.6183	.5761	.9316	5.685
.2670	.2490	1.678	.9326	2.583	2.770	.3610	3.355	14.31	14.34	.6172	.5756	.9320	5.675
.2680	.2501	1.684	.9334	2.600	2.786	.3589	3.368	14.49	14.53	.6162	.5752	.9324	5.665
.2690	.2513	1.690	.9342	2.618	2.803	.3568	3.380	14.67	14.71	.6152	.5747	.9328	5.655
.2700	.2524	1.697	.9350	2.636	2.819	.3547	3.393	14.86	14.89	.6142	.5742	.9331	5.645
.2710	.2536	1.703	.9357	2.653	2.835	.3527	3.405	15.05	15.08	.6132	.5737	.9335	5.636
.2720	.2547	1.709	.9365	2.671	2.852	.3506	3.418	15.24	15.27	.6122	.5733	.9339	5.627
.2730	.2559	1.715	.9373	2.689	2.869	.3485	3.431	15.43	15.46	.6112	.5728	.9343	5.617
.2740	.2570	1.722	.9381	2.707	2.886	.3465	3.443	15.63	15.66	.6102	.5724	.9346	5.608
.2750	.2582	1.728	.9388	2.726	2.903	.3444	3.456	15.83	15.86	.6092	.5719	.9350	5.599
.2760	.2593	1.734	.9396	2.744	2.920	.3424	3.468	16.03	16.06	.6082	.5714	.9354	5.590
.2770	.2605	1.740	.9403	2.762	2.938	.3404	3.481	16.23	16.26	.6072	.5710	.9358	5.582
.2780	.2616	1.747	.9410	2.781	2.955	.3384	3.493	16.43	16.47	.6063	.5705	.9362	5.573
.2790	.2627	1.753	.9417	2.799	2.973	.3364	3.506	16.64	16.67	.6053	.5701	.9366	5.565
.2800	.2639	1.759	.9424	2.818	2.990	.3344	3.519	16.85	16.88	.6044	.5696	.9369	5.556
.2810	.2650	1.766	.9431	2.837	3.008	.3324	3.531	17.07	17.10	.6035	.5691	.9373	5.548
.2820	.2662	1.772	.9438	2.856	3.026	.3305	3.544	17.28	17.31	.6025	.5687	.9377	5.540
.2830	.2673	1.778	.9445	2.875	3.044	.3285	3.556	17.50	17.53	.6016	.5682	.9381	5.532
.2840	.2684	1.784	.9452	2.894	3.062	.3266	3.569	17.72	17.75	.6007	.5677	.9384	5.524
.2850	.2696	1.791	.9458	2.913	3.080	.3247	3.581	17.95	17.98	.5998	.5673	.9388	5.516
.2860	.2707	1.797	.9465	2.933	3.099	.3227	3.594	18.18	18.20	.5989	.5668	.9392	5.509
.2870	.2718	1.803	.9472	2.952	3.117	.3208	3.607	18.40	18.43	.5980	.5664	.9396	5.501
.2880	.2730	1.810	.9478	2.972	3.136	.3189	3.619	18.64	18.67	.5971	.5659	.9400	5.493
.2890	.2741	1.816	.9484	2.992	3.154	.3170	3.632	18.88	18.90	.5962	.5654	.9404	5.486



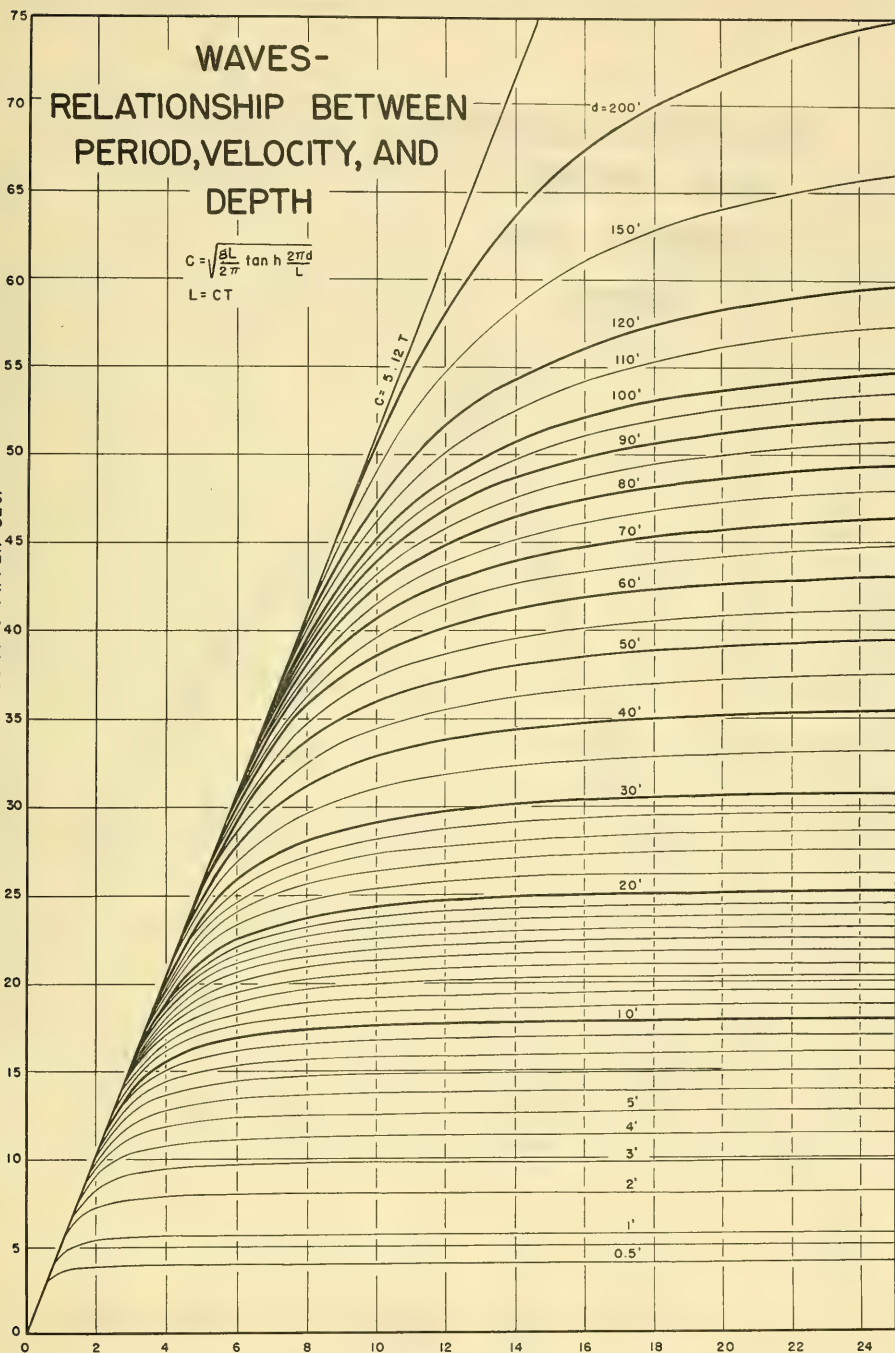


# WAVES- RELATIONSHIP BETWEEN PERIOD, VELOCITY, AND DEPTH

$$C = \sqrt{\frac{gL}{2\pi} \tanh \frac{2\pi d}{L}}$$

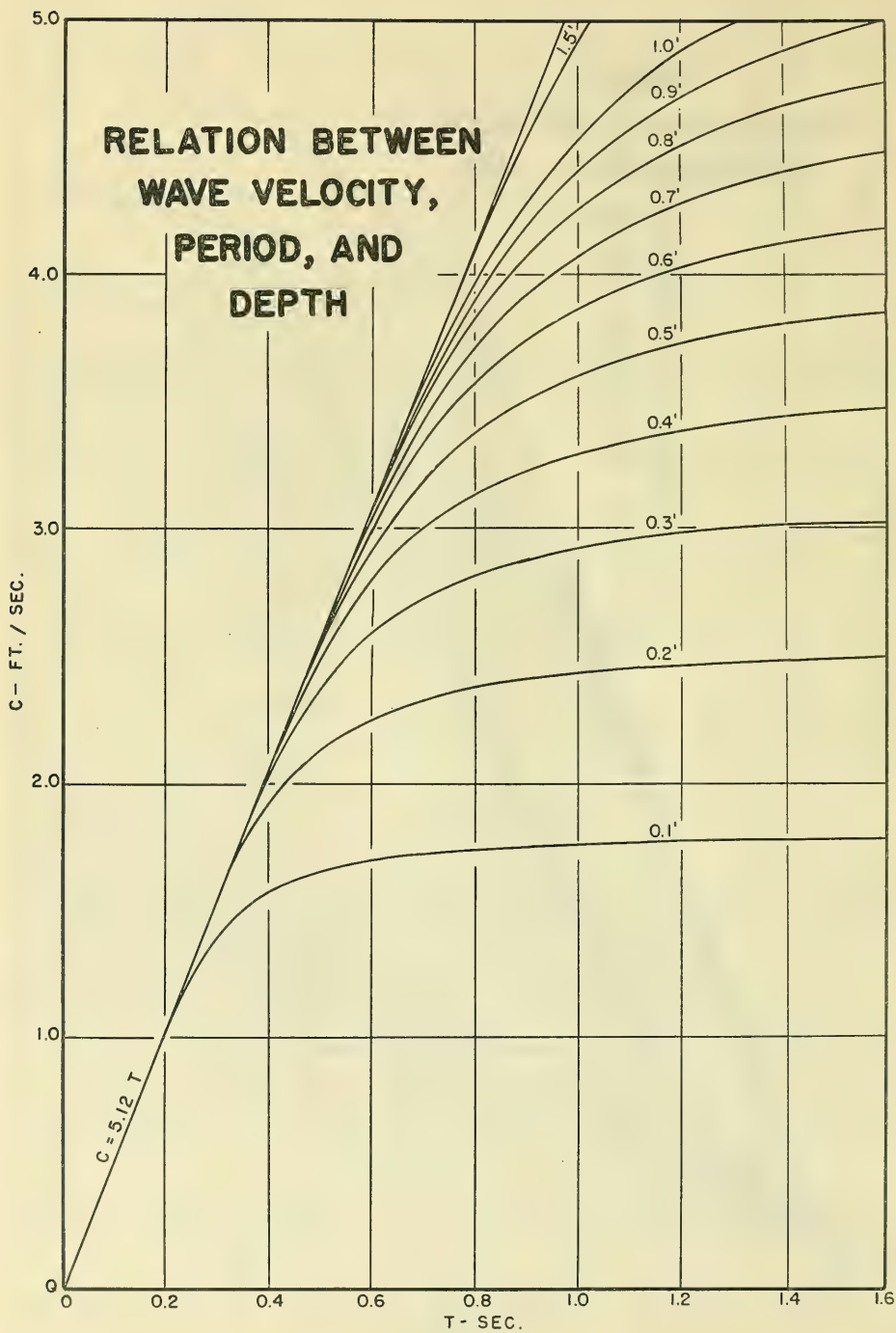
$$L = CT$$

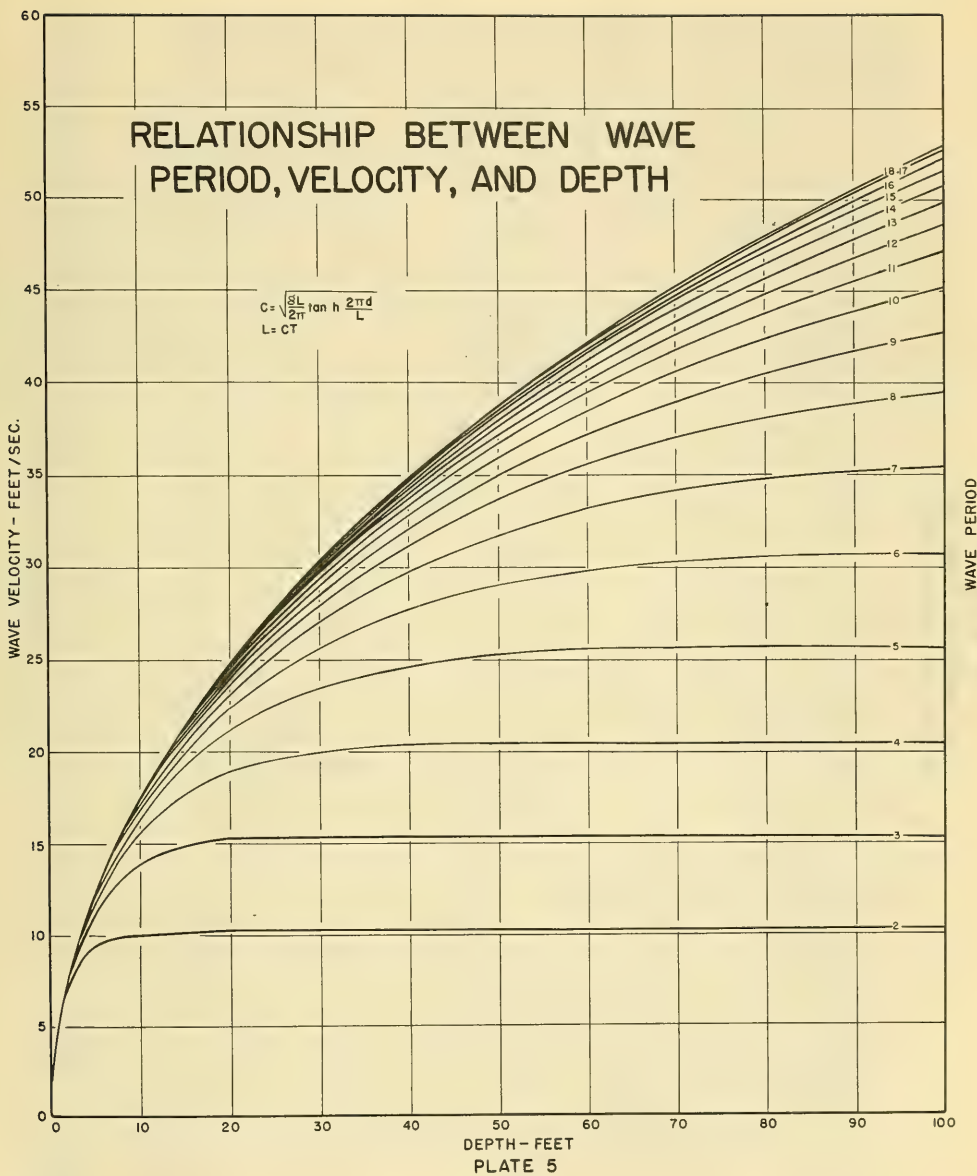
WAVE VELOCITY- C-FT. PER SEC.



PERIOD-T-SEC.

PLATE 3



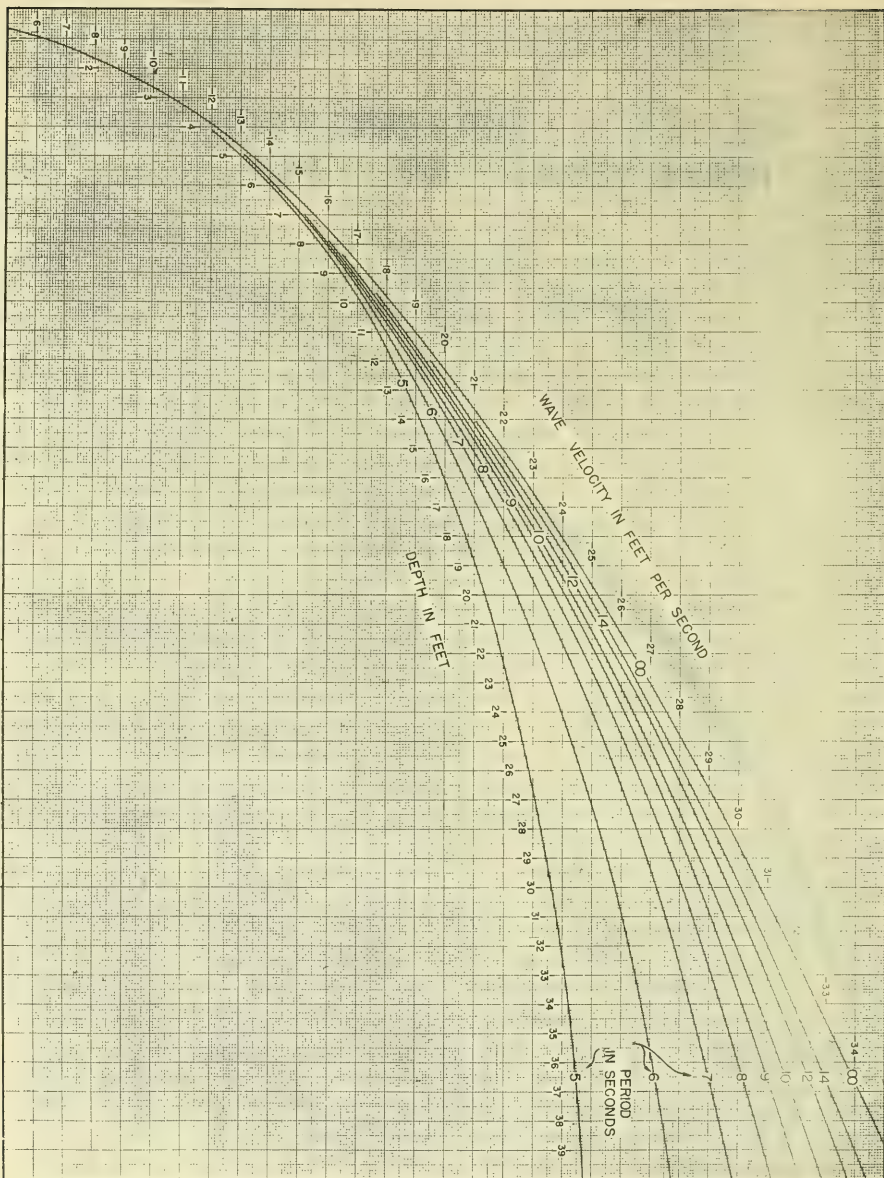


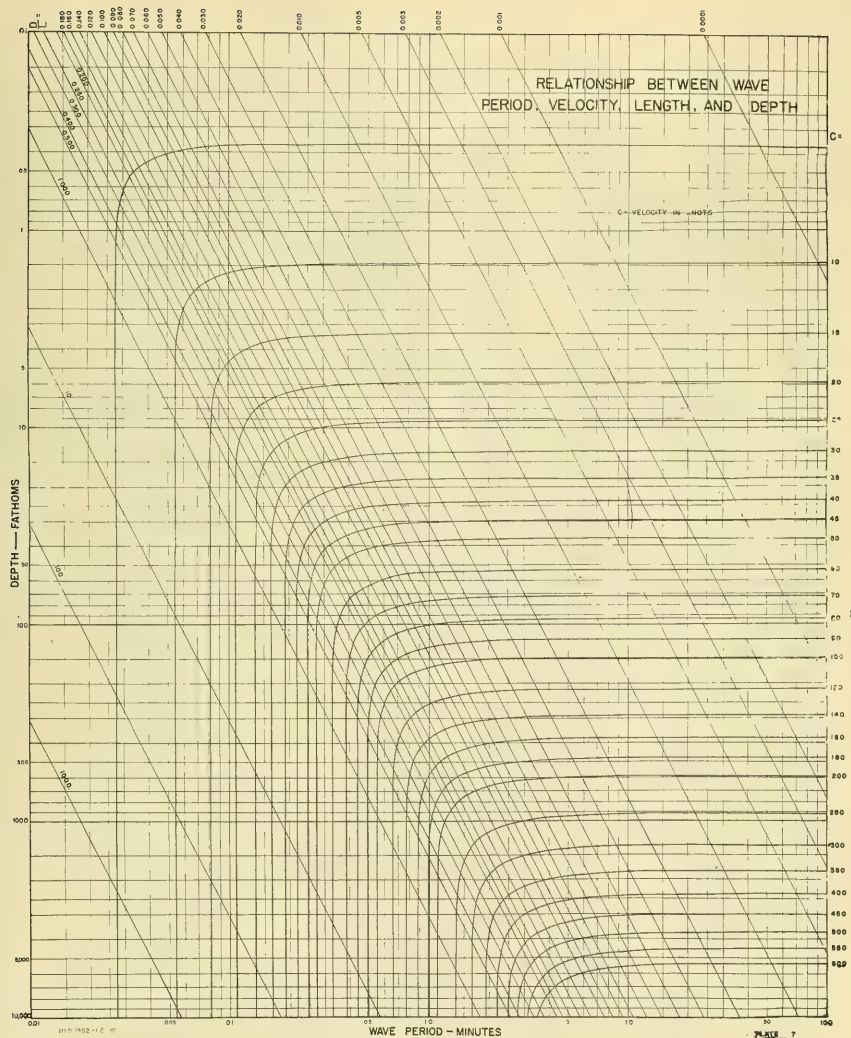
WAVE VELOCITY IN FEET PER SECOND

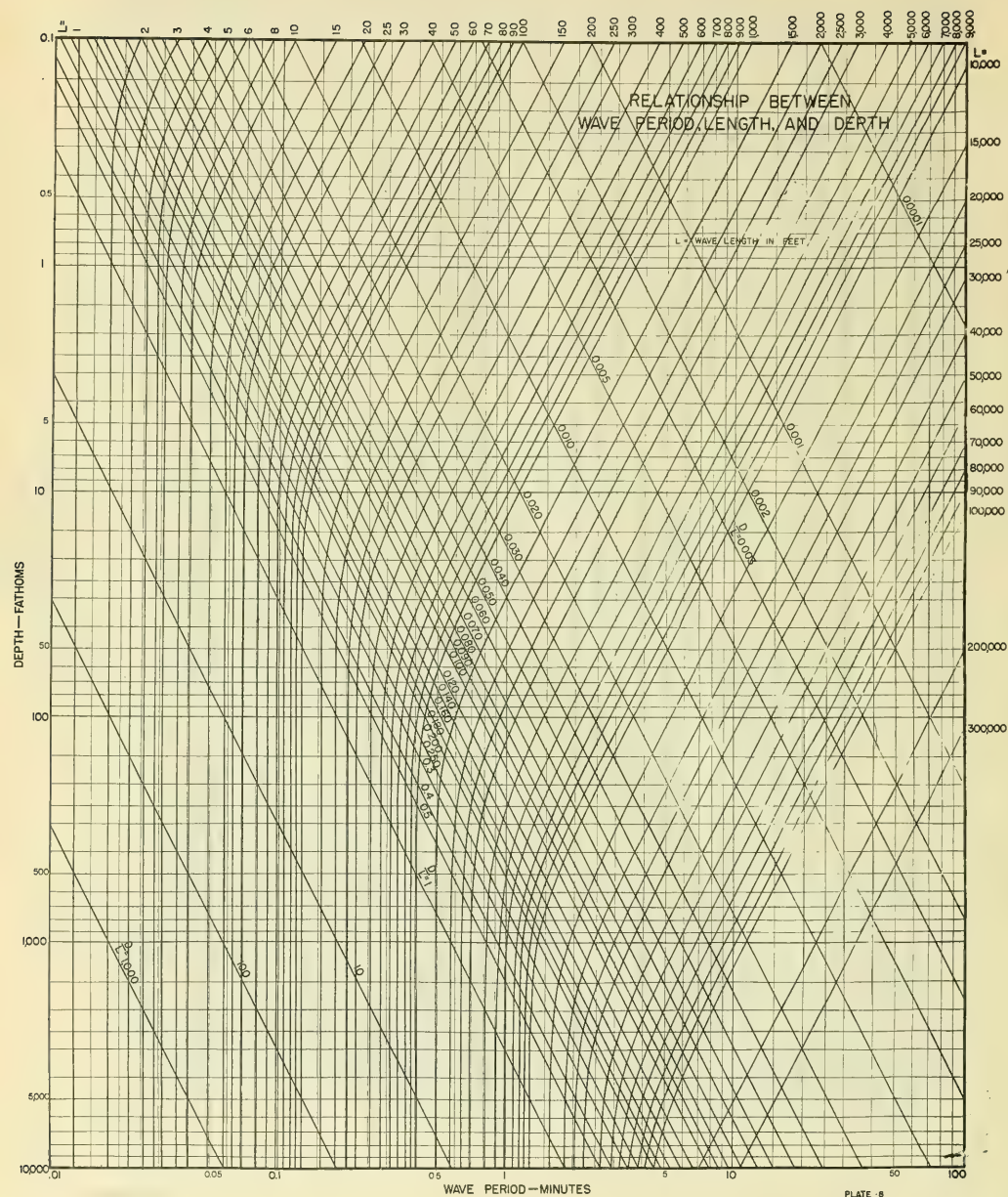
DEPTH IN FEET

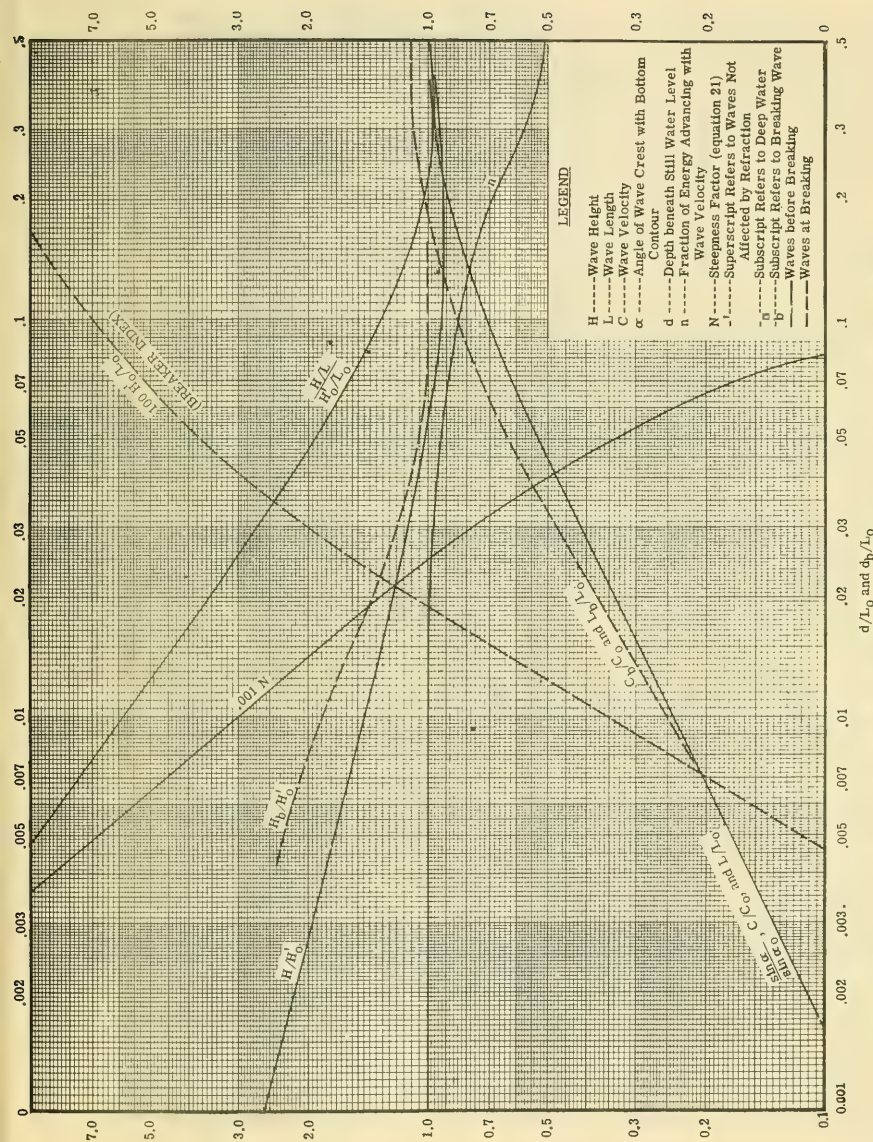
PERIOD  
IN SECONDS

DEPTH DETERMINATION FROM WAVE VELOCITIES, WITH CORRECTION  
FOR WAVE STEEPNESS  
PLATE 6

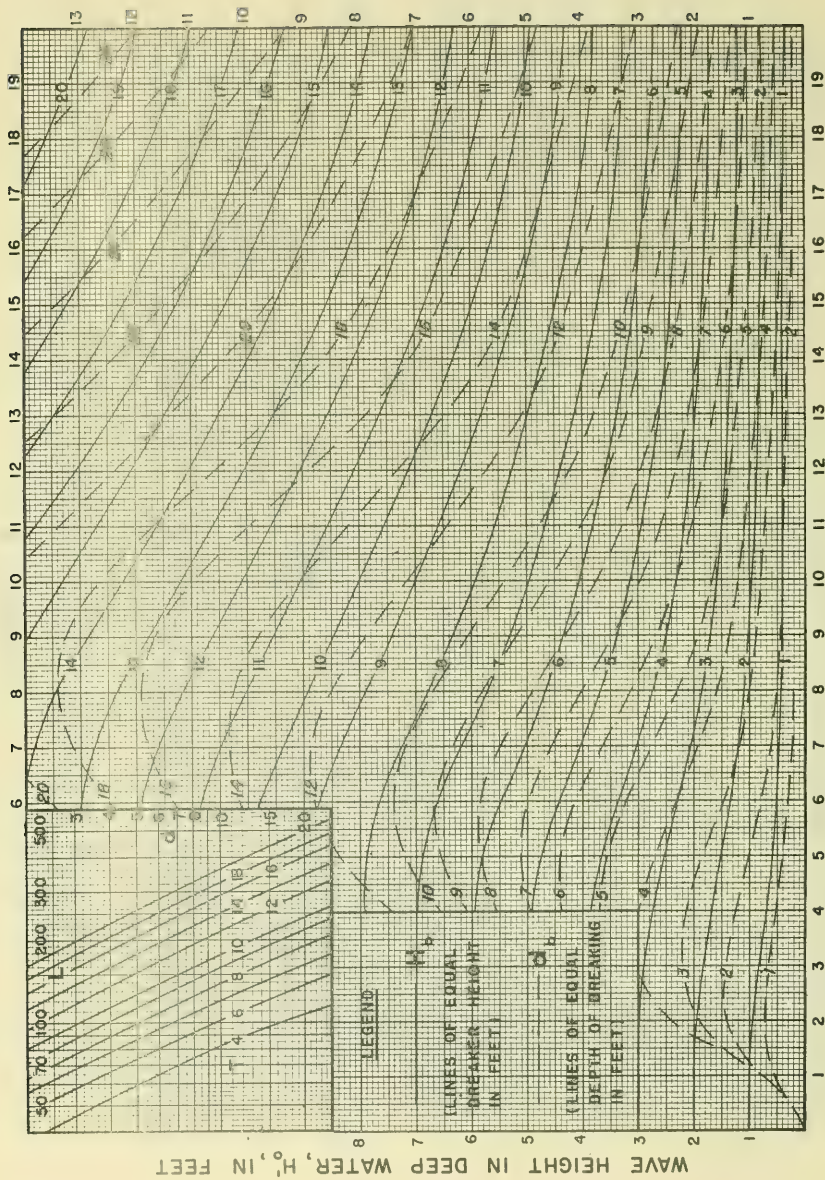








WAVES IN SHALLOW WATER. CHANGE IN HEIGHT AND LENGTH FROM DEEP WATER TO POINT OF BREAKING



DETERMINATION OF WAVE HEIGHT AND DEPTH OF WATER  
AT POINT OF BREAKING

# EFFECT OF CAPILLARITY ON WAVE VELOCITY- FRESH WATER AT 70° F

WAVE VELOCITY - FT. PER SEC.

PERCENT ERROR

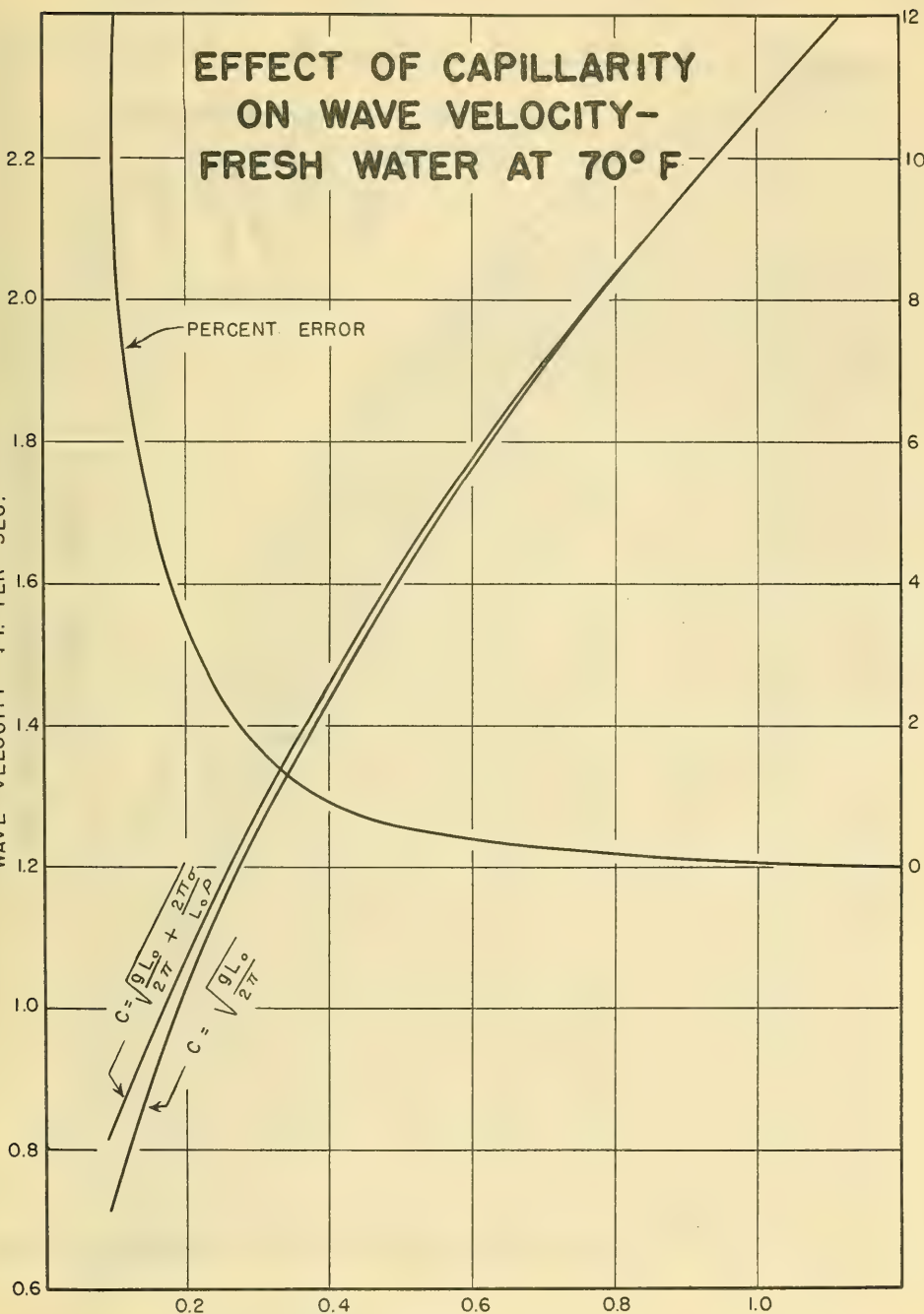
PERCENT ERROR

$$C = \sqrt{\frac{gL_0}{2\pi} + \frac{2\pi\sigma}{L_0\rho}}$$

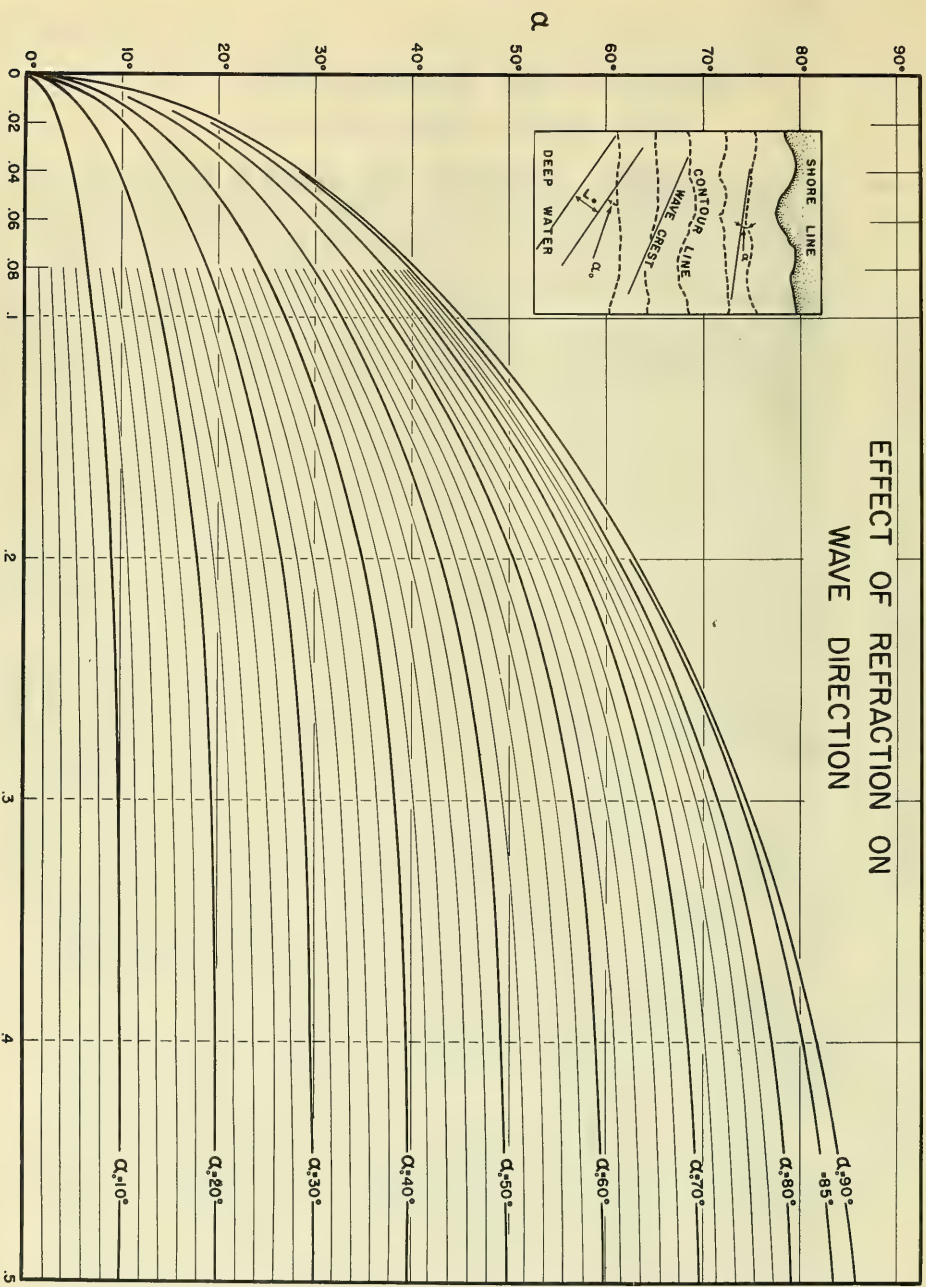
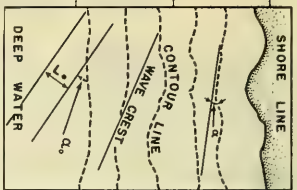
$$C = \sqrt{\frac{gL_0}{2\pi}}$$

WAVE LENGTH -  $L_0$  FT.

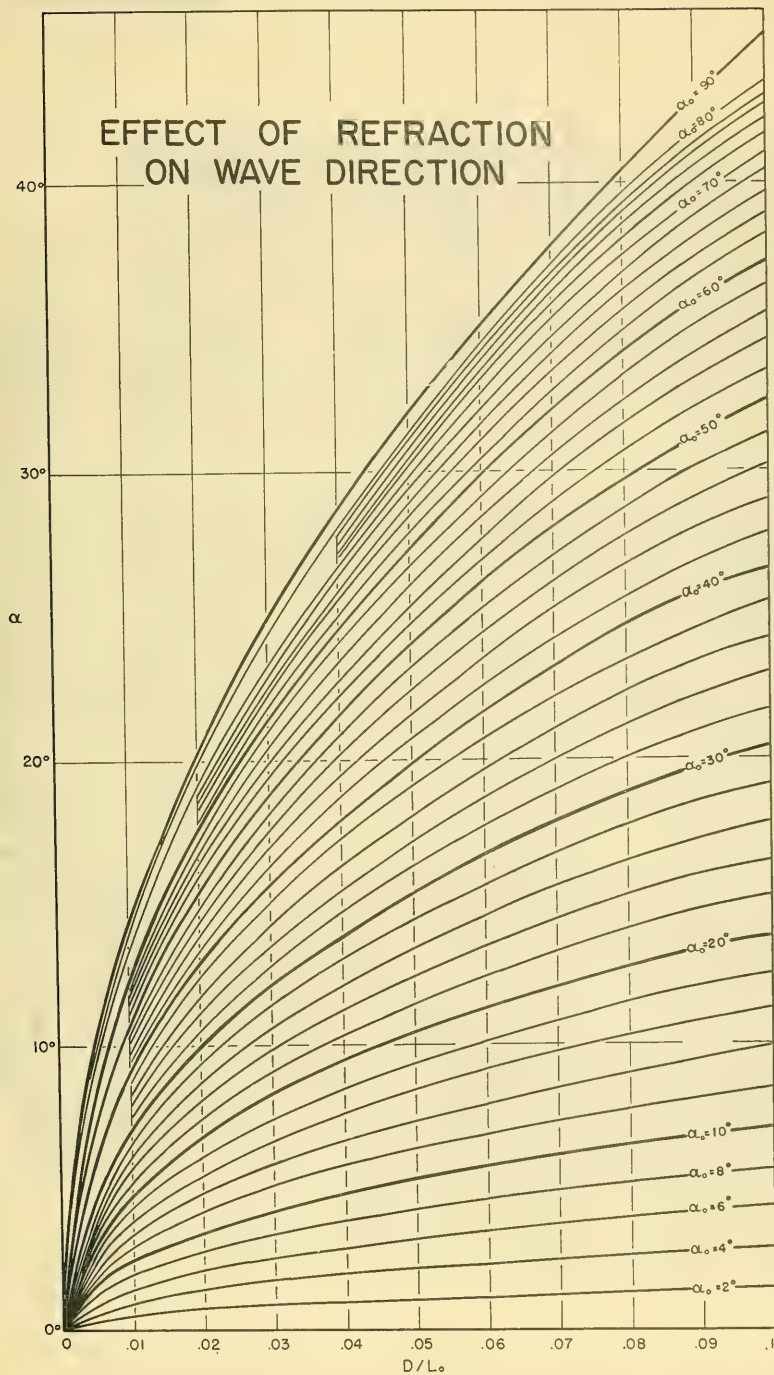
PLATE II

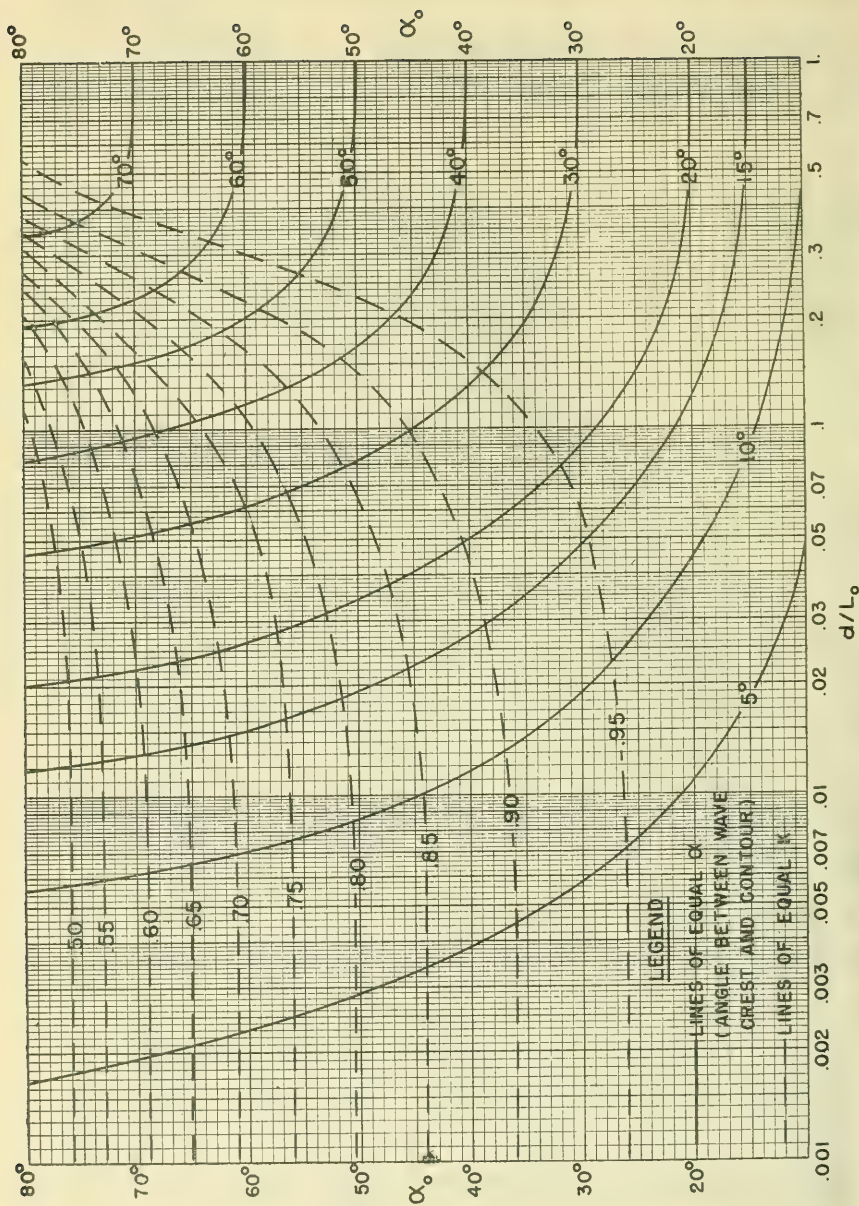


# EFFECT OF REFRACTION ON WAVE DIRECTION



# EFFECT OF REFRACTION ON WAVE DIRECTION





CHANGE IN WAVE DIRECTION AND HEIGHT DUE TO REFRACTION ON BEACHES WITH STRAIGHT, PARALLEL DEPTH CONTOURS

# CALIBRATION CURVES FOR CONSTANT K

$$K = \cosh \left[ \frac{(2\pi D)}{L} \left( 1 - \frac{z}{D} \right) \right]$$

$$\cosh \frac{2\pi D}{L}$$

z = DISTANCE FROM SURFACE

D = DEPTH TO BOTTOM

L = WAVE LENGTH

z/D

0.0

0.1

0.2

0.3

0.4

0.5

0.6

0.7

0.8

0.9

1.0

K = 0.10

K = 0.15

K = 0.20

K = 0.25

K = 0.30

K = 0.35

K = 0.40

K = 0.45

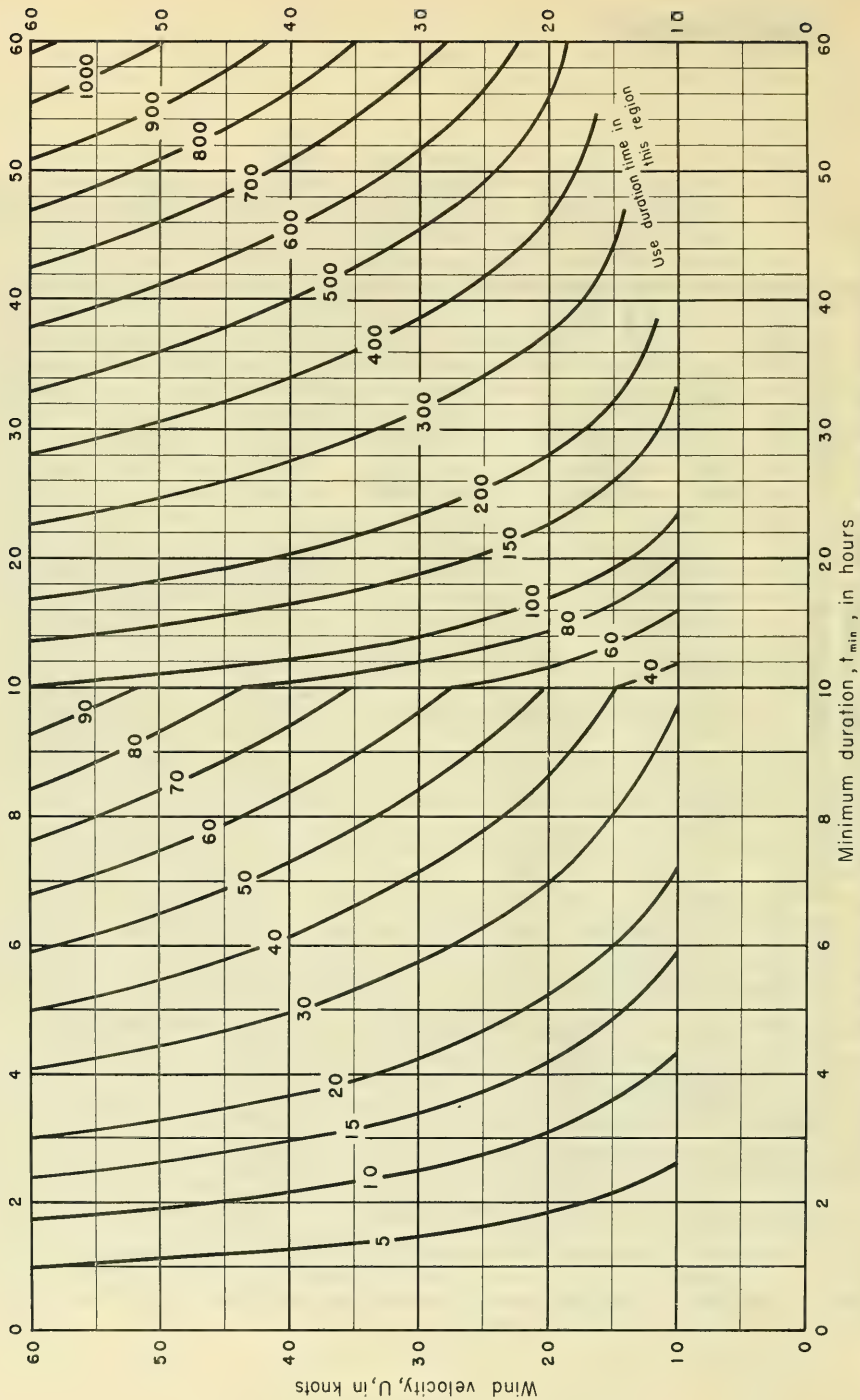
K = 0.50

K = 0.60

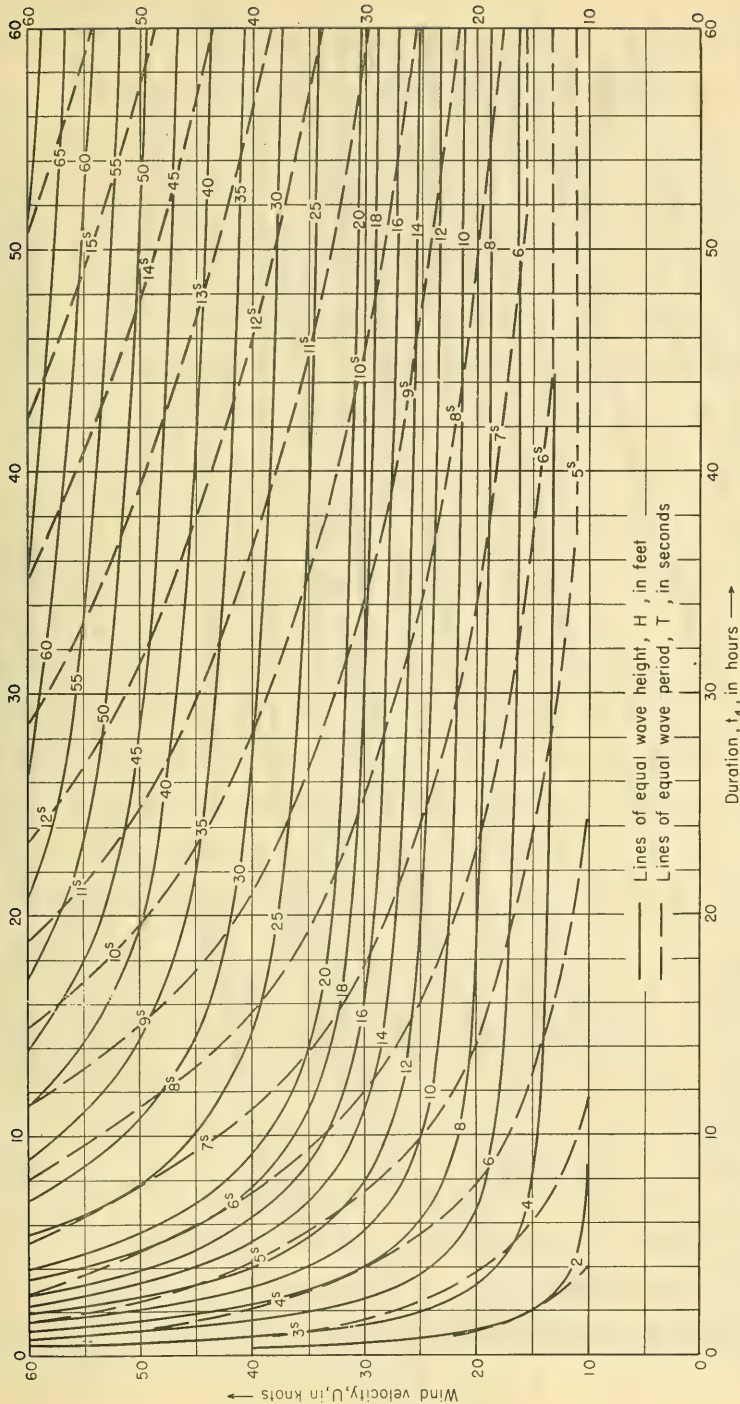
K = 0.70

K = 0.80

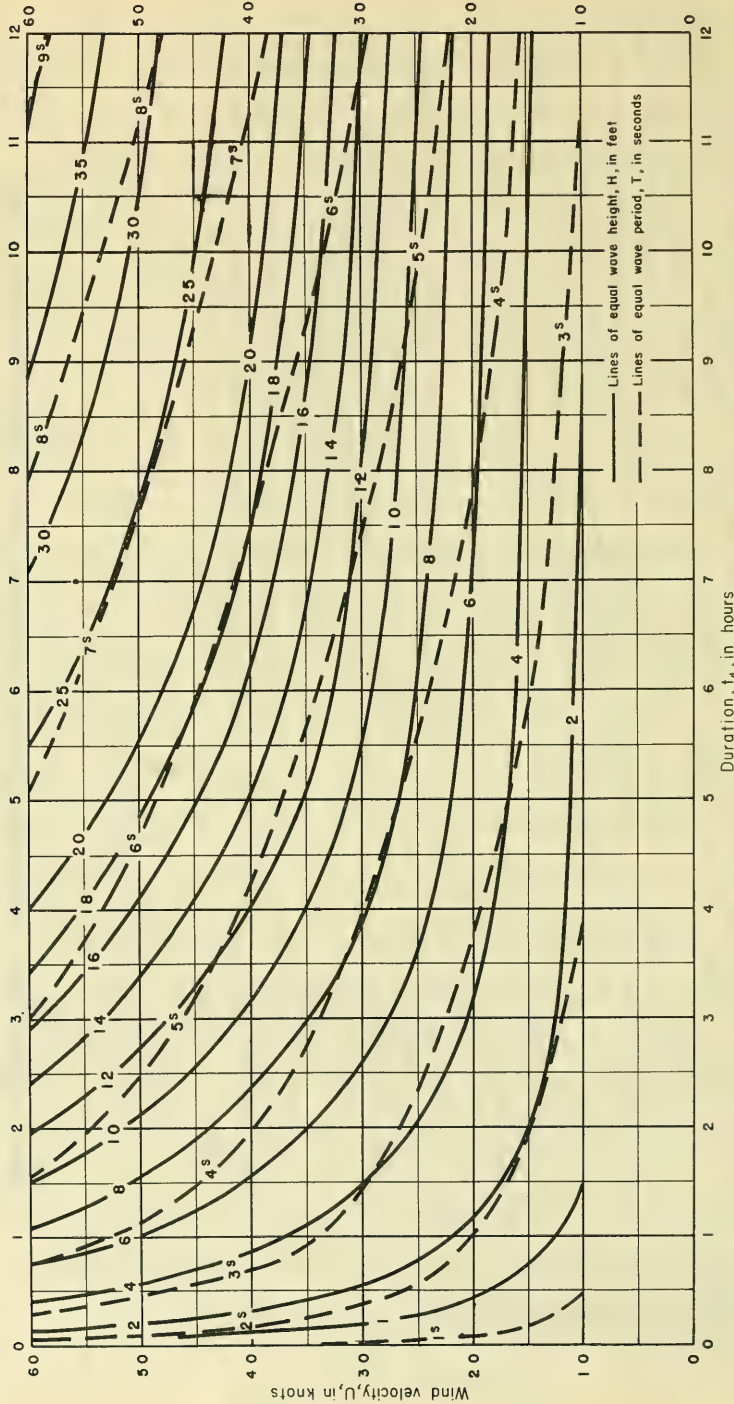
K = 0.90



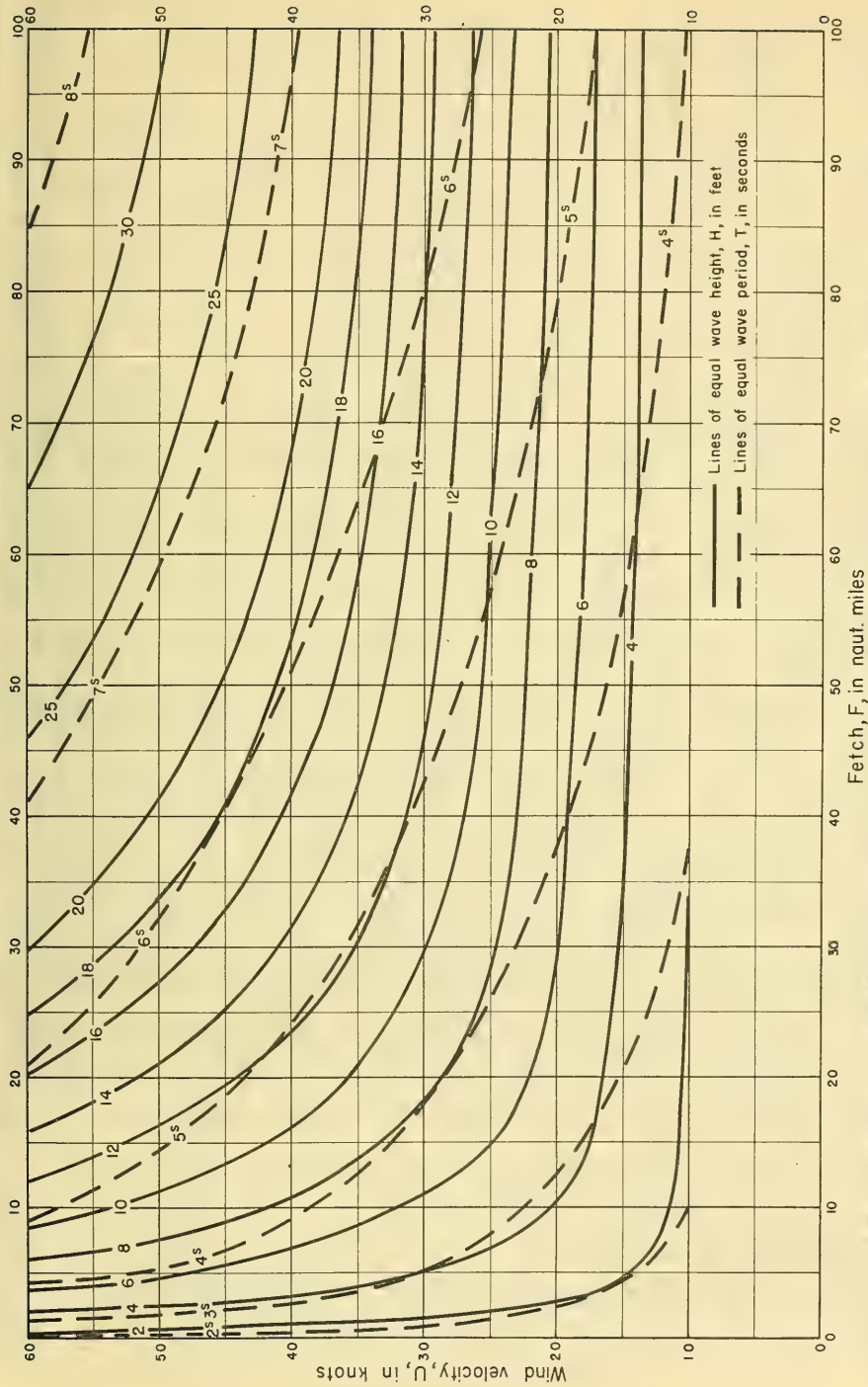
**FETCH IN NAUTICAL MILES AS A FUNCTION OF MINIMUM DURATION AND  
VELOCITY OF WIND**



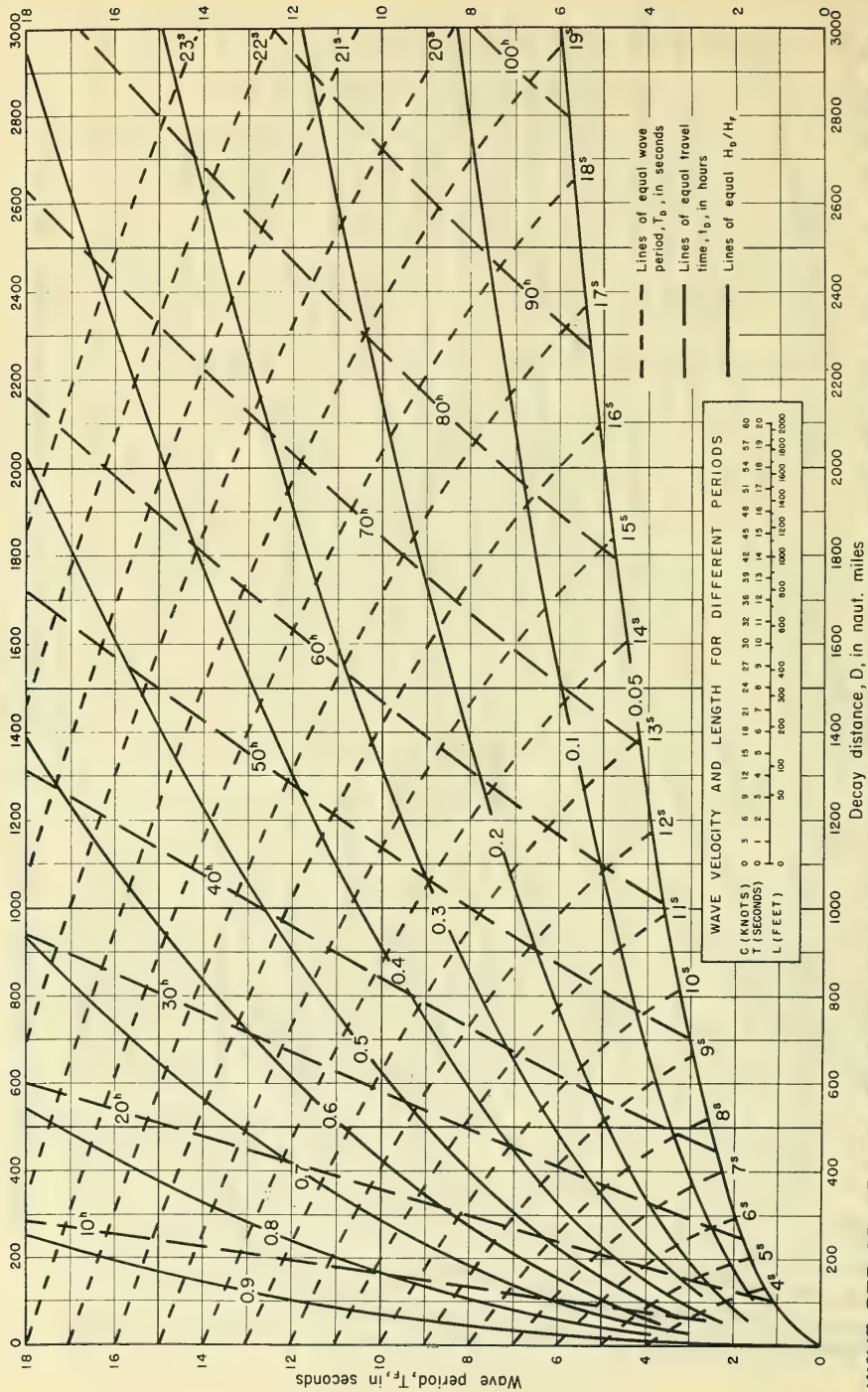
**WAVE HEIGHT AND WAVE PERIOD AS FUNCTIONS OF DURATION OF WIND AND WIND VELOCITY**



WAVE HEIGHT AND WAVE PERIOD AS FUNCTIONS OF SHORT DURATION OF WIND AND WIND VELOCITY



WAVE HEIGHT AND WAVE PERIOD AS FUNCTIONS OF SHORT FETCH AND WIND VELOCITY  
 PLATE 19



WAVE PERIOD AT END OF DECAY DISTANCE, TRAVEL TIME, AND RATIO BETWEEN WAVE HEIGHT AT END OF DECAY DISTANCE AND AT END OF FETCH AS FUNCTIONS OF DECAY DISTANCE AND WAVE PERIOD AT END OF FETCH

PLATE 20

# ILLUSTRATION OF VARIOUS FUNCTIONS OF $d/L_0$

